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Proceedings in the United States Court of Appeals for the Ninth Circuit

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IN THE

United States Court of Appeals

For the Ninth Circuit

No. 17,608

SOUTHERN CALIFORNIA EDISON COMPANY,
Petitioner,

vs.

FEDERAL POWER COMMISSION,
Respondent.

PUBLIC UTILITIES COMMISSION OF THE STATE OF CALIFORNIA,
Petitioner,

vs.

FEDERAL POWER COMMISSION,
Respondent.

On Petition to Review and Set Aside Orders of the Federal Power Commission

JOINT APPENDIX

Volume I

(1)

1

Before the Federal Power Commission

In the Matter of:	
CITY OF COLTON, CALIFORNIA,	Docket No. E-6821
vs.	
SOUTHERN CALIFORNIA EDISON COMPANY.	

Hearing Room "E"
Federal Power Commission
441 G St., N.W.
Washington, D. C.
Tuesday, December 8, 1959

The above-entitled matter came on for hearing, pursuant to notice, at 10 o'clock a. m.

BEFORE:

HARRY W. FRAZEE, Presiding Examiner.

APPEARANCES:

JOHN W. CRAGUN, ESQ.,
of Wilkinson, Cragun & Barker, 744 Jackson Place, N. W., Washington, D. C.;

LYMAN H. COZAD, City Manager,
Colton, California;

REUBEN GOLDBERG, ESQ.,
439 Wyatt Bldg., Washington 5, D. C.; and

RICHARD R. WILKINS, ESQ.,
744 Jackson Place, N. W., Washington, D. C.,
appearing on behalf of City of Colton, California.

ROLLIN E. WOODBURY, ESQ.,
HARRY W. STURGES, JR., ESQ., and
JOHN R. BURY, ESQ.,
P.O. Box 351, Los Angeles 53, California,
appearing on behalf of Southern California Edison Company.

KARL K. ROOS, ESQ., and
WILLIAM M. BENNETT, ESQ.,
California State Bldg., San Francisco 2, California,

appearing on behalf of California Public Utilities Commission.

JOHN S. EVERETT, JR., Trial Attorney,
appearing on behalf of the Staff of the Federal Power Commission.

Technical Aides and Consultants:
Charles N. Harman
Harold E. Miller
Stanley W. Roland
Joseph V. Stumpf
Thomas G. Sonner

PROCEEDINGS

Presiding Examiner: The hearing in Docket No. E-6821 will come to order.

This hearing will be recessed long enough to permit reconvening in Room 113 of the Lafayette Building.

(Recess taken.)

Presiding Examiner: The hearing will come to order, please.

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By a notice of the Federal Power Commission issued on the 28th day of August, 1959, this hearing was set for ten a.m. on this date.

The City of Colton, municipal corporation in the State of California, by a formal petition filed with this Commission on the 9th day of May, 1958, which said petition was numbered E-6821 by the Federal Power Commission, requests this Commission to institute an investigation, and thereafter to direct the Southern California Edison Company, hereinafter referred to as Edison, whose home office is located in the city of Los Angeles, California, to file, as an effective rate schedule, in accordance with the Federal Power Act, a power supply contract dated the 1st day of October, 1945, between Edison and the Petitioner, which said contract provides for the wholesale sale of electric power and energy by Edison to the Petitioner.

The Petitioner further prays for an order of this Commission directing Edison to cease and desist from charging

it any rates other than those set out in the aforesaid contract between the parties.

Petitioner further prays that Edison be required to account for the difference between the amounts it has collected and the amount set forth in the aforesaid contract between the parties, and to make refunds with interest thereon at six percent.

Edison filed an answer on the 9th day of June, 1958, in which they dispute the jurisdiction of the Federal Power Commission and pray the petition be dismissed on jurisdictional grounds.

To resolve the factual questions, the Federal Power Commission's staff made a field examination of the physical properties and operating data of the Petitioner and of Edison and others, and concluded from that report, which was served upon the Petitioner and Edison, that this wholesale sale by Edison to the Petitioner did come under the jurisdiction of this Commission.

The Public Utilities Commission of the State of California, in a letter to the Commission on the 26th day of May, 1958, expressed their opinion that the electric service in question was subject to their jurisdiction.

Edison, in a letter to the Commission on the 3rd day of August, 1958, indicated it was willing to stipulate as to certain data as disclosed by the staff report of its investigation.

Edison, in this letter, indicated it regarded a formal hearing as necessary in order that it might develop certain other facts.

Written notice of the filing of the aforesaid petition has been sent to the Arizona Corporation Commission, Public Utilities Commission of the State of California, and the Nevada Public Service Commission.

Thereafter, and on the 2nd day of December, 1959, Edison filed a formal motion to dismiss the petition of the City of Colton.

This morning I am in receipt of a motion to dismiss filed by the Public Utilities Commission of the State of California. I have been designated by the Chief Examiner to preside at this hearing. The certificate of the Records Officer that proper service and publication have been

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made of the notice of this hearing is ordered to be copied into and made a part of the record at this point.

FEDERAL POWER COMMISSION

November 12, 1959

In the Matter of: City of Colton, Calif, and
Southern Calif. Edison Co.
Docket No. E-6821

MEMORANDUM FOR THE PRESIDING OFFICER:

The records in the Office of Administration show that notice of the hearing scheduled to commence on December 8, 1959

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in the above-entitled matter was published in the Federal Register on 11/5/59; 24 FR; P. 9031, and issued October 29, 1959 to the parties and interested persons of record and to States or other governmental authorities deemed to have an official interest in the proceeding.

Charles C. Bennington
Records Officer

Presiding Examiner: There is herewith handed to the official reporter the list of appearances as furnished me by the Secretary of the Commission.

If there be counsel present who have not formally filed their appearance with the Secretary, they will do so now on the record.

Mr. Goldberg: Mr. Examiner, I don't think that my appearance is entered formally in the Secretary's office. I am Reuben Goldberg, 439 Wyatt Building, Washington 5, D. C., on behalf of the City of Colton.

Mr. Roos: Mr. Examiner, I don't believe that my appearance has been formally filed with the Secretary's office. I am Karl K. Roos, State Building, Civic Center, San Francisco, appearing in behalf of the Public Utilities Commission of the State of California.

Presiding Examiner: Any others?

Mr. Cragun: Mr. Examiner, Mr. Richard R. Wilkins is not in the room at the moment, but he will enter an appearance on

behalf of the City of Colton. He is a member of the District of Columbia Bar, with offices in this city.

Presiding Examiner: Thank you.

Mr. Cragun: He has filled out a form which will be handed in.

Presiding Examiner: Thank you, Mr. Cragun.

Are there any others?

(No response.)

Presiding Examiner: Are there any preliminary matters?

Mr. Goldberg: Mr. Examiner, I might make an inquiry with respect to these motions to dismiss filed by Southern California Edison and the California Commission on the eve of this hearing. Does the Examiner regard these motions as before him?

Presiding Examiner: They are.

Mr. Goldberg: In that case, Mr. Examiner, may we assume, safely—and when I say "we" I mean the City of Colton—that we will deal with this motion to dismiss in our brief at the conclusion of these proceedings?

Presiding Examiner: Well, Mr. Goldberg, under the rules of the Federal Power Commission an Examiner doesn't have the authority to pass upon a motion to dis-

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miss at this time. I can do one of two things: I can certify it to the Commission now for the Commission's action and continue with the hearing, or I can rule on it in my initial decision. In either event,

we will go forward with the hearing. So if you want to argue the motions to dismiss for the record, we will do so now.

Mr. Goldberg: It would seem to me, Mr. Examiner, a rather unnecessary taking of time to deal with these motions at this time. In fact, we think these motions are actually denied, were denied before they were even filed, because the motions, you will notice, request that the Commission deny our petition for an investigation and a hearing.

Well, the Commission has already acted on our request for an investigation and hearing, and they have granted that investigation and that hearing and have done so on the basis of information supplied by its own staff that indicates, clearly, the jurisdiction of the Federal Power Commission over the sale by Southern California Edison to the City of Colton, and the merit of our petition.

Now, if you are going to construe this motion as going beyond the request for an investigation and actually dealing with the issues that the motion purports to raise; namely, is this a sale—stating the ultimate conclusion—in interstate commerce within the purview of the Commission's jurisdiction under the Federal Power Act?—well, it would seem to me that that issue we can deal with fully and completely at the conclusion of the hearing, and there is no occasion to deal with it now. That is why we are here to have the hearing.

Now, the thing that we are anxious about is that we want an understanding on the record that we will not be deemed to be in default in response to this motion because we wait until the end of this proceeding and the filing of our briefs to respond to it.

Presiding Examiner: Mr. Goldberg, you will not be.

Mr. Goldberg: Thank you. I think it would make considerably more sense to deal with it in the briefs.

Presiding Examiner: Does Edison wish to be heard on its motion to dismiss?

Mr. Bury: The motion has been filed. We feel the motion is before the Examiner. If Colton decides it does not wish to respond, that of course is its decision. It was our thought that, under the law and under the facts as submitted in the affidavit attached to the motion, there was before the Commission and before the Examiner sufficient grounds to dismiss this proceeding without hearing.

If the Examiner wishes to reserve ruling and proceed with hearing at this time, that is perfectly appropriate. However, we feel that the Examiner and the Commission do have the authority under the law and under the facts to dismiss this proceeding without a hearing, and that was what we have in question.

Presiding Examiner: Well, the Commission may have, but the Examiner does not.

Mr. Bury: I appreciate that. I agree there is no reason

for us to argue the motion at this time.

Presiding Examiner: Well, they are before the Commission and they are before me, and if—as I say, there are two steps open: One of them is to refer the motions to dismiss immediately to the Commission, in which event

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I would proceed with the hearing, or, in the alternative, I rule on the motions to dismiss when I file my initial decision. So in either event you brief them in your briefs.

Mr. Bury: That is right. That is perfectly all right.

Mr. Goldberg: Let me make one thing clear. Mr. Bury indicates that Colton does not wish to respond, and it is its privilege. Colton does wish to respond. I was suggesting only that a more orderly approach to it would be to deal with it at the end of the proceeding. I think certain things Mr. Bury states indicates that we correctly construe this as a motion to dispense with the hearing, which we have already passed. The Commission has already decided we are going to have a hearing. But let me emphasize this, I think perhaps this is important:

One reading the motions might come away with the impression that we have here new questions, new issues never before the Commission, never passed upon by the Commission. But you know, Mr. Examiner, there isn't a single new issue in the case. I think I can fairly say that all we have in this case are tired, old issues, tried and retried and answered by the

Commission and numerous circuits and the Supreme Court of the U. S., adversely to Southern California Edison's contentions in this case and adverse to the contentions of the California Commission.

These cases I don't find in the motions. I would like to refer the Examiner, just for the sake of the record, for example, to the decision of the 7th Circuit in 1952, involving Wisconsin-Michigan Power Company. The name of the case is Wisconsin-Michigan Power Company, versus the Federal Power Commission, reported in 197 Federal 2nd, 472, certiorari was denied at 345 U. S. 934 and the

decision of the Commission which was affirmed is reported in 10 FPC 170.

The Examiner will find that not only does that case effectively and finally dispose of the issues that Southern California Edison and the California Commission would raise here, but that there is a case in the local circuit, entitled State of Wisconsin and Public Service Commission of Wisconsin versus the Federal Power Commission, which puts to rest these issues.

That is reported in 201 Federal 2nd 183, certiorari was denied 345 U. S. 834, and the Commission's decision affirmed by the courts is reported in 10 FPC 225.

And coming even closer to home, involving a California utility, California operations, and the California Commission, the Supreme Court of the U. S. has spoken on these issues in

United States of America versus the Public Utilities Commission. That is reported in 345 U. S. 285, decided in 1953, and by the 9th Circuit, you might say the home court of the Public Utilities Commission and of these California utilities, in California Electric Power Company versus Federal Power Commission, reported in 199 Federal 2nd 206.

And there is another 9th Circuit decision of interest dealing with these same issues, Federal Power Commission versus Arizona Edison Company, reported in 194 Federal 2nd 679.

So we don't have anything new here, Mr. Examiner.

Mr. Bury: May I be heard?

Presiding Examiner: Yes, Mr. Bury.

Mr. Bury: I just want to make a few brief comments. We now apparently have our response to the motion.

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I just want to make this comment. Mr. Goldberg referred to some rather tired issues. I am sure we will find that these issues are very vital, very vital. As you will find, one thing, when reference is made to the authorities cited by Mr. Goldberg, we have very radically different factual situations in this case, which we intend to develop, very significantly different, and I think a full examination of those facts will show that the cases cited are not precedents by any means. And we do have some new issues in this case which have never been before this Commission, and in fact before the courts. And that is, of course, to the effect of the Section 6

of the Boulder Canyon Project Act.

I mention these radically different facts. We have set them forth, as we intend to prove them, in the affidavit attached to the motion to dismiss, and I think we will find that there will not be very significant disputes on these factual matters. The differences that do exist are vital ones, but there will not be a great many, and it is because there was very little dispute as to the facts, and because these facts were very radically different from those in the authorities cited by Mr. Goldberg, that we chose the approach of the motion to dismiss because we believe that the authorities cited, and the law and the facts, established that there is simply no jurisdiction here, and that the Commission should not proceed.

Mr. Goldberg: Mr. Examiner, one thing is not clear to me, and I wonder if Mr. Bury's (sic) cares to express the position of his company on it.

I am not certain whether Southern California Edison is contending that it is not a public utility, as that term is defined in Part 2 of the Act.

Mr. Bury: Excuse me. Let me make this clear: Edison is not here trying to avoid regulation by this Commission as to matters within its jurisdiction. Edison both is a licensee under Part 1 of the Act, and as a company who owns and operates facilities for the transmission of electric energy in inter-

state commerce, has been for many years subject to regulation by the Commission under the applicable provisions of the Act, and we have never sought to resist that jurisdiction. This situation, where we are trying to extend jurisdiction to this particular sale, Edison Company feels very strongly that neither the facts nor the law support the Federal Power Commission jurisdiction, and we intend to resist it strenuously.

I think we have answered Mr. Goldberg's question.

Mr. Goldberg: In other words, you do concede that your company is a public utility, as that term is defined under Part 2 of the Act, but you contend that the particular sale here involved is not a sale subject to the F.P.C. jurisdiction?

Mr. Bury: That is correct. I think we have narrowed some issues already.

Mr. Goldberg: All right.

Presiding Examiner: Does the California Commission wish to be heard on their motion?

Mr. Roos: Mr. Examiner, we feel as Edison does, that these sales are not under the jurisdiction of the Federal Power Commission for the reasons set out in our brief. However—and we do feel that the matters can be disposed of on the law without the necessity of further hearing or any hearing. But as the Examiner has indicated, the procedure before this Commission, we feel that

perhaps the best method would be to deal with the matter in the briefs, as indicated. Thank you.

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Presiding Examiner: Thank you, Mr. Roos.

Any other preliminary matters?

Mr. Everett: May Staff Counsel be heard?

Presiding Examiner: Yes, Mr. Everett.

Mr. Everett: Mr. Examiner, inasmuch as you have stated on the record that these two motions to dismiss are now pending before you, the staff assumes that it would be appropriate for the staff's answer to these motions to be made here now orally upon the record; is that correct?

Presiding Examiner: That is correct.

Mr. Everett: The staff, Your Honor, requests that these motions be ruled upon by you as a part of your initial or recommended decision submitted at the conclusion of this hearing.

Presiding Examiner: Thank you, Mr. Everett.

Have you agreed upon an order of procedure?

Mr. Everett: Mr. Examiner, the staff is prepared to open this hearing, and we have prepared an opening statement, and we assume that we will have an opportunity to close, also, in view of the fact that we are opening.

Presiding Examiner: The question that I posed was whether or not the staff was going to proceed or whether or not the City of Colton was going to proceed.

Mr. Everett: Mr. Examiner, staff is prepared to go forward first.

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Presiding Examiner: Do you wish to make an opening statement before calling your first witness?

Mr. Everett: Yes, sir, we do wish to make such a statement.

Mr. Examiner, the staff proposes to present in evidence at this hearing the results of the field examination of the physical facilities and/or the records of the City of Colton, California, and the Southern California Edison Company and other utilities undertaken by the staff to resolve these factual questions which were raised by the jurisdictional dispute growing out of the City's petition and the Company's answer to that petition.

It is the staff's position that this evidence to be presented by it will show that the Company owns and operates facilities for the transmission and sale, at wholesale, of electric energy in interstate commerce, subject to the jurisdiction of the Federal Power Commission under the provisions of the Federal Power Act, and that the wholesale electric service rendered to the City by the Company is also subject to the jurisdiction of the Federal Power Commission under the provisions of the Federal Power Act.

The staff also proposes to take such action as it believes to be necessary at this hearing to insure a completion of the record to permit a disposition by the Commission of the issues in this proceeding.

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Presiding Examiner: Thank you, Mr. Everett.

Any other opening statements?

Mr. Goldberg: None other than I can say we will be prepared to follow the staff with such presentation as we are planning to make.

Presiding Examiner: Thank you.

Mr. Bury: I have really just a question as to procedure: As I understand this proceeding, this is a hearing on Colton's petition, and that therefore it had been my impression that Colton is the moving party in this case. Certainly if the staff wishes to proceed first, that is fine;

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we have no objection to that. But I hope I am correct in assuming that the staff's appearance in this case is really as an interested party and that this is a hearing on Colton's petition.

Presiding Examiner: Mr. Bury, as I see it, the burden of proof is upon the City of Colton, and the staff here—while they are parties—they are here in the public's interest rather than being either for or against the Petitioner or the Southern California Edison or the California Commission.

Mr. Bury: I was quite sure the burden of proof wasn't on us. I just wanted that understanding.

Presiding Examiner: Thank you.

Mr. Goldberg: Let me just state for the record that we do not conceive the burden of proof being on the City of Colton, nor do we conceive this as being a proceeding on a complaint by

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the City of Colton. The City of Colton filed a petition drawing attention to certain facts and making certain allegations, drawing attention to what it believed was a violation of the Federal Power Act by Southern California Edison, and it asked the Commission to direct its attention to those matters and take steps to eliminate the violations. The Commission's staff made an investigation, an investigation which indicated that there was a violation of the Federal Power Act by the Southern California Edison Company.

The Commission initiated, by its order of August 28, 1959, an investigation and hearing, and you will note in that order that the Commission cites its investigatory power, Section 307, as part of its basis for going into this proceeding; and, as you will find, it is the investigation of

its staff which the Commission recites as justifying this investigation which it initiated, and the hearing.

As an investigation, particularly in an administrative procedure, the Commission is concerned, as the Examiner will be concerned, with whether the record of that investigation supports findings that we shall ask for and that we hope the staff will ask for, that the sale by Southern California Edison to the City of Colton is a sale within the purview of Part 2 of the Act, that Southern California Edison should be required to file its rates with the Federal Power Commission and make restitution to the City of Colton in accordance with the evi-

dence adduced at these proceedings.

It will be of no concern in that investigation whether the evidence that supports the findings that the Examiner will make, and that the Commission will make, whether that evidence came from the staff, came from Southern California Edison or came from us, or was a combination of all of our efforts in this proceeding.

Presiding Examiner: That I understand. Thank you, Mr. Goldberg.

Call your first witness, Mr. Everett.

Mr. Bury: Excuse me. I am sorry. I had hoped I would have a chance to make a few opening comments. I know we have had quite a bit of interchange. We have argued a bit of the case. But I did want to make a very brief outline of just what Edison's position was and what it intended to prove, so that we might have a frame of reference by which we could proceed.

Presiding Examiner: You may make your statement, Mr. Bury.

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Mr. Bury: Essentially, you have had before you our motion to dismiss and the affidavit attached which will indicate the facts we believe we will prove, the points and authorities generally set forth the legal arguments which we believe are pertinent to this case. I think they can be very briefly summarized.

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The first argument is one which we believe is a vital issue, and a unique one, and that is that the Boulder Canyon Project Act precludes Federal Power Commission jurisdiction over this particular sale. The legal and factual matters relating to the Hoover Project are unique and rather complex, and they have been the subject of rather special Congressional attention.

Now, as an exhibit to the motion to dismiss we have attached at the end a letter, copy of a letter from Edison to the Commission of March 24, 1954, in which we set forth, I think rather fully, the legal and factual matters which we thought were pertinent to the appication of that statute. We think a full reading of that will develop that argument.

Of course, we take the position, as stated in our motion, that no interstate energy is sold to Colton by Edison. Edison believes that the conclusions stated in the Staff Engineering Report are invalid. We expect to show there is no competent evidence to support Colton's allegation.

Secondly, we wish to take—it is our position that the F.P.C. lacks jurisdiction because the sale to Colton is really a matter of local concern, involving only the interests of the State of California and its citizens, and not within the scope of the Federal Power Act.

The sale to Colton, even if assumed to include deliveries of interstate energy, are made only from facilities used in

local distribution, and therefore not within the purview of the Act.

As set forth further in the motion, it is our contention that Colton is estopped to assert the plea that is in its petition.

This sale has been regulated by the California Commission since the inception of regulation in California in 1911-1912, and Colton has always taken the affirmative position in favor of the jurisdiction of the California Commission. They have fully participated in all those proceedings, they have had knowledge of all the facts and they have never raised the issue of jurisdiction or lack of jurisdiction of that Commission prior to the filing of the petition here.

If that issue had been raised, Edison could have taken steps to protect itself. It could have sought a resolution of the issue at that time, and the least it could have done would be to have terminated that '45 contract at the end of its initial term in 1955.

Lastly, we feel that this Commission should not entertain the petition, for the reason that this issue was investigated by the Commission back in '53 and '54, as shown by the exchange of correspondence which is attached to that motion. The matter was fully argued, the Commission was presented with a full exposition of Edison's views as to the law and to the facts, and the Commission declined to act at that time, and has

not acted since.

We believe that the Commission at that time exercized sound discretion. We believe that the law and facts demonstrate that there is no jurisdiction, and at most, that even

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if the allegations contained in the petition were deemed to be true, at most you have a border-line area where the F.P.C. should continue to refrain from acting. Clearly there is no matter of national or Federal interest in this case.

Thank you.

Presiding Examiner: Any other statements?

Mr. Goldberg: Just don't construe our silence as acquiescing, even in the factual statements made. One of them, for example, I will draw your attention to, that the Commission declined to act. There is no evidence that the Commission declined to act. The most that Mr. Bury could say is that no action was taken at that time, but the existence of this hearing, it would seem to me, would negative any other conclusion he seeks to draw from that lack of action at that time.

Presiding Examiner: Call your first witness, Mr. Everett.

Mr. Everett: Yes, Your Honor.

Your Honor, the staff would like to have the record show that it is not replying in kind to many of the matters mentioned in Mr. Bury's opening statement, because the staff believes those matters will be discussed later on in this hearing or those matters should be more appropriately covered in

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the brief.

Presiding Examiner: Thank you.

Mr. Everett: Mr. Miller, will you take the stand, please, and be sworn in?

Harold E. Miller

was called as a witness, being first duly sworn, and testified as follows:

Direct Examination

By Mr. Everett:

Q. Mr. Miller, would you please state your full name and your address for the record. A. Harold E. Miller, 4616 Fourth Street, South, Arlington, Virginia.

Q. What is your profession, Mr. Miller? A. Electrical engineer.

Q. What institution of learning did you attend, and for what period of time? A. I attended Cornell University from 1918 to 1922.

Presiding Examiner: Mr. Goldberg, do you have any question as to Mr. Miller's qualifications?

Mr. Goldberg: No, indeed.

Presiding Examiner: California Commission?

Mr. Roos: No, Mr. Examiner.

Presiding Examiner: Edison?

Mr. Bury: Excuse me?

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Presiding Examiner: Have you any question as to his qualifications?

Mr. Bury: I would like to hear them, really, if you would.

Mr. Everett: Would the reporter please read that last question and answer?

(Question and answer read.)

By Mr. Everett:

Q. What degree do you hold, Mr. Miller? A. I hold a degree of Electrical Engineering, conferred by Cornell University.

Q. Are you a licensed engineer? A. Yes, I am licensed as a professional engineer in the District of Columbia.

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Q. By whom are you now employed? A. I have been employed by the F.P.C. as an electrical engineer since May 1939, except for the period from July 1942 to February 1946, when I was on military leave.

Q. Would you please give us brief outline of your training and experience prior to entering upon your present employment? A. I was employed for over three years as an electrical engineer by the National Advisory Committee for Aeronautics. I was employed for approximately 3½ years as a telephone engineer by Bell Telephone Laboratories, Incorporated. I was employed

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for one year and three months as an engineer by Chance-Vought Aircraft. I was employed as an electrical engineer for over a year by Hamilton Standard Propellers. I was engaged in private business for approximately four years.

Q. Would you please explain your duties in your present position? A. I assemble engineering data and make the necessary studies which enable me to prepare engineering reports of electric utilities. In connection with this work I study the operation of their systems, including loads and outputs of their generating stations, their wholesale energy transactions, and demands and energy consumption of their transmission networks and substations, to determine the direction and amount of energy flow over their lines and through their substations.

I make field investigations, check operating data, and observe facilities and methods of operation whenever necessary. I prepare exhibits, tabulations and data for use at hearings conducted under the authority of the Commission. I have testified for the Commission in the matters of Arizona Edison Company, Inc., Docket No. E-6194, Central Arizona Light and Power Company, Docket No.

E-6212, the Connecticut Light and Power Company, Docket No. IT-5665, Interstate Light and Power Company, a Wisconsin corporation, Docket No. E-6252, and The Ohio Public Service Company, Docket No. IT-5563.

I prepare engineering reports in connection with applications for permits under Executive Order No. 10485, applications

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under Section 202 of the Federal Power Act for authorization to establish and maintain permanent connections for emergency use only or to export electric energy to foreign countries, applications under Section 203 of the Federal Power Act for authorizations to dispose of facilities or to merge facilities, and applications under Section 204 of the Federal Power Act for authorization to issue securities. I carry out other related and similar duties as directed.

Q. Mr. Miller, have you made a study of the reports of Southern California Edison Company and of the City of Colton, California? A. I have.

Q. Would you please describe generally the reports which you have studied? A. Annual Reports Forms No. 1 for the years 1954 through 1958, and Power System Statements Forms No. 12 for the years 1954 through 1958, filed with the Commission by Southern California Edison Company; Annual Reports, Forms No. 1, for the years 1954 through 1958, and Power System Statements, Forms No. 12-A, for the years 1954 through 1958, filed with the Commission by the City of Colton, California.

Q. What do you mean by Annual Reports? A. Annual Reports Forms No. 1 are primarily financial and accounting reports filed annually by electric utilities with the Federal Power Commission. These reports do contain some engineering and operating data.

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Q. What are Power System Statements? A. Power System Statements are reports filed annually by electric utility systems. Form No. 12 contains data on engineering features and operations of systems including, among other things: installed capacity, capability, output, and engineering features of generating plants; electric energy transfers with other electric utility systems; energy accounting; energy transfers across State boundaries; monthly and annual peak load data; analysis of system dependable capacity and system assured capacity; distribution of load in service area; system maps and diagrams and associated tabular data; high voltage line loading data; and system forecasts. Form No. 12A is a simplified report which includes most of the foregoing schedules, some in condensed form.

Q. Have you studied the reports of any interconnecting companies or utilities? A. Yes, I have studied the Power System Statements of Metropolitan Water District of Southern California, Colorado System-Lower Basin-USBR, and Boulder Canyon Project-USBR.

Q. When you say USBR, what do you mean? A. USBR is the abbreviation for U. S. Bureau of Reclamation of the Department of Interior, which operates Hoover, Davis and Parker Dams.

Mr. Everett: Mr. Examiner, the staff would like to offer this map for identification.

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Presiding Examiner: It will be marked Exhibit No. 1, for identification.

(The document above referred to was marked Exhibit No. 1 for identification.)

By Mr. Everett:

Q. Mr. Miller, you have the map, Exhibit No. 1 for identification. Would you please state for the record what it shows? A. It was prepared primarily to show the relative geographic locations of Hoover Dam, Davis Dam, and Parker Dam Power Plants and of the Hayfield, Highgrove and Colton substations and the intervening transmission lines. It also shows the State boundaries crossed by the various lines and, among other things, the Gene pumping plant of Metropolitan Water District of Southern California. I expect to use later in my testimony a diagram which I have had prepared and which I believe will be easier to follow than the map.

Q. Where are these three dams located? A. Hoover Dam spans the Colorado River between Nevada and Arizona at a point known as Black Canyon. Nine generating units at Hoover Dam are located in Arizona and eight in Nevada. Davis Dam spans the Colorado River between Nevada and Arizona about 60 miles downstream from Hoover Dam. The five generating units at Davis Dam are located in Arizona.

Parker Dam spans the Colorado River between California

and Arizona about 150 miles downstream from Hoover Dam. The four generating units at Parker Dam are located in California.

Q. Who is the owner of these dams and power plants? A. The United States.

Q. Have you made a field examination of records of Southern California Edison Company? A. Yes, I have examined the "Station Meter and Temperature Readings" sheets of the Highgrove and Colton substations.

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Q. Would you please describe the location of the Highgrove and Colton substations? A. The Highgrove substation is located in California approximately 1.8 miles south of the Colton substation. The Colton substation is located in the city of Colton, California.

Q. Have you made a field examination of the records of other utilities? A. Yes. I have examined records of the USBR at Hoover Dam and Parker Dam.

Q. Have you made a field examination of any of the facilities of Southern California Edison Company? A. Yes. I have visited the Etiwanda station, the Highgrove substation, the Colton substation, and the City of Colton substation owned by Southern California Edison Company, and the Southern California Edison Company dispatcher's office at Hoover Dam Power Plant. I have checked the 220 kv and 66 kv buses at Highgrove substation and the 66 kv bus at Colton

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substation to confirm that the latest one-line diagrams of Southern California Edison Company correctly depicted the order of the circuits on the buses.

Q. Where is Etiwanda Station located? A. Etiwanda Station is located in California, approximately fifteen miles west and north of Highgrove substation.

Q. What do you mean when you speak of a one-line diagram? A. A one-line diagram is a diagrammatic representation of one or more electric systems or parts thereof depicting each circuit by a single line. The order of connection of circuits and facilities are correctly shown but no attempt is made to depict geographic locations or show distances to scale.

Q. Have you made a field examination of the facilities of other utilities? A. Yes. I examined facilities of the

USBR at Hoover and Parker Dams. I also examined facilities of MWD at Gene Pumping Plant.

Q. What does MWD signify? A. Metropolitan Water District of Southern California.

Q. When were these field examinations of records and facilities made? A. During the period starting January 9, 1959, and ending February 7, 1959.

Mr. Everett: Mr. Examiner, the staff wishes to offer for

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identification the one-line diagram which has just been distributed.

Presiding Examiner: It will be marked Exhibit No. 2 for identification.

(The document above referred to was marked Exhibit No. 2 for identification.)

By Mr. Everett:

Q. Mr. Miller, did you supervise the preparation of the one-line diagram, Exhibit 2, for identification? A. Yes.

Q. What are the sources of the diagram? A. Principally Southern California Edison Company diagrams as follows: System Single Line Diagram No. 71036-3; Highgrove Substation One Line Diagram For Operation No. 419485-4; Colton Substation One Line Diagram for Operation No. 418597-7; Colton Switching Center 11 kv lines (unnumbered) Revision No. 3. I checked the accuracy of the Southern California Edison Company information on the USBR and MWD facilities against maps and diagrams of the USBR and MWD.

Q. Does Exhibit 2 for identification correctly depict the order of connection of circuits? A. Yes. For simplicity's sake all switches normally closed have been replaced in the diagram by solid connections.

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Q. Did you discuss the mode of operation of the 220 kv and the 66 kv circuits with operating personnel of Southern

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California Edison Company? A. Yes. I was informed that the 220 kv circuits between Chino and Highgrove substations are operated with switches closed under normal operating conditions but the 66 kv circuits are opened at some point or points to avoid parallel 220 kv and 66 kv parallel operation between these substations.

I was also told that at Highgrove substation both 66 kv buses are at all times connected through transformer bank 1A to the west 220 kv bus and through transformer bank 2A to the east 220 kv bus.

I was further told that the east and west 66 kv buses at Highgrove substation are operated in parallel with each circuit connected to both buses by individual oil switches and associated equipment and that, under normal operating conditions, when an oil switch is closed through to the east or west bus, the corresponding switch to the other bus is also closed.

Mr. Roos: May we ask that the witness read his testimony a little slower? It is rather technical testimony here, Mr. Miller.

The Witness: I will do that.

By Mr. Everett:

Q. Why is provision made, Mr. Miller, for connecting the 66 kv circuits at Chino and Highgrove if the switches are normally open?

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A. In order to enable the transmission of energy between them at times when it is necessary to open the 220 kv circuits for construction, maintenance or because of faults.

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Q. Is the Highgrove substation connected to the Colton Substation? A. Yes. The two 66 kv lines respectively marked "E" and "W" and connected to the fifth and sixth positions on the bus connect the Highgrove 66 kv substation to the Colton 66 kv substation with no intervening taps. A third 66 kv line marked "N" on the diagram also connects the Highgrove and Colton 66 kv substations with a tap at Colton Cement and a tap connection (normally open) to a circuit from the Chino 66 kv substation. A fourth possible connection between Colton and Highgrove substations is via the line marked "S" but this would require closure of switches which are normally open.

Q. Mr. Miller, in your answer to the last question, did you speak of a tap at Colton substation? Perhaps the reporter can read that answer back, please.

(Answer read.)

Presiding Examiner: Mr. Everett, we will take the morning recess.

(Whereupon, at 11:15 a. m., a recess was taken to 11:25 a. m.)

Presiding Examiner: Proceed.

By Mr. Everett:

Q. Mr. Miller, referring to Exhibit No. 2 for identifica-

tion, to what does the "E" shown, the letter "E" shown below the first position on the 66 kv bus of Highgrove substation refer? A. It refers to the circuit connected to the "E" line of California Electric Power Company.

Q. Is the 66 kv Colton substation connected to the point of supply to the City of Colton? A. Yes. From positions 1 and 3, counting from the left, circuits extend to the transformer banks supplying the Colton Substation 11 kv bus. From that bus two circuits marked Globe Mills and

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Derby, respectively, extend to the City of Colton substation where the voltage is stepped down to 4 kv for distribution by the City of Colton.

Q. Referring to the diagram, Exhibit No. 2 for identification, what are the possible sources of supply of the Highgrove substation? A. The circuit from Etiwanda, the circuit from Chino and the circuit from Hayfield.

Q. Would you please state the location of the Hayfield substation? A. It is located in California, approximately 105 miles east of Highgrove substation.

Q. Who owns the Hayfield substation? A. M.W.D.

Q. Who owns the transmission line from the Hayfield sub-

station to the Highgrove substation? A. Southern California Edison Company.

Q. When energy is received at Highgrove from Hayfield, where does that energy originate? A. All or the greater part at Hoover Dam. Part, however, may at times be generated at Davis Dam and Parker Dam.

Q. Using the diagram, Exhibit No. 2 for identification, will you please describe the possible paths of flow of energy from Hoover Dam to the City of Colton? A. One possible path of energy flow from Hoover Dam to the City of Colton is from Hoover generators N5 and N6, shown at the top of the diagram over the 220 kv line to Camino switching station and then past Iron Mountain and Eagle Mountain pumping plants of MWD to Hayfield substation; then from Hayfield substation to the 220 kv bus at Highgrove substation to the 66 kv bus at Highgrove substation to the 66 kv bus at Colton substation to the 11 kv bus at Colton substation to the Globe Mills and Derby lines to the City of Colton substation where delivery is made at 4 kv to the City of Colton. This path is shown on the diagram in heavy lines from Hoover Dam to the City of Colton substation.

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A second possible path is from Hoover Dam Power Plant over a USBR 220 kv line to Davis Dam Power Plant; then from Davis over a USBR 220 kv line to Parker Dam Power Plant; and from Parker a 220 kv line to Gene pumping plant. From Gene pumping plant the path continues over an MWD 220 kv line to

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Camino where it joins the first path to Colton as previously described.

Q. Where is the Gene Pumping Plant located? A. In California, approximately 4.7 miles from Parker Dam Power Plant.

Q. What is MWD? A. MWD is a municipal corporation organized by thirteen cities in Southern California, including Los Angeles, to construct and operate an aqueduct 250 miles long, tapping the Colorado River at Parker Dam 150 miles below Hoover Dam and bringing water to the coastal areas.

Q. How is the water moved through the aqueduct? A. By pumps. MWD has established five pumping plants, respectively known as Intake, Gene, Iron Mountain, Eagle Mountain, and Hayfield through which the water is lifted and pumped in sequence as stated from the Colorado River to a high point in the aqueduct just west of Hayfield reservoir. From that point the water moves by gravity into the water distribution feeder system.

Q. Do these pumps require considerable power? A. Yes. Initially there were installed three pumps at each pumping station forming three strings of pumps. Each string had a combined capacity of 35,600 kw, making a total requirement of 106,800 kw, if all pumps are in operation. Since then, additional strings of pumps have been placed in

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service as the need for water grew. At the time of the field examination in January and February, 1959, there where six pumps at each plant, with a total requirement of 213,600 kw.

Q. From whom does MWD obtain its power requirements? A. From the USBR, or from Southern California Edison Company.

Q. Where does MWD obtain its power requirements from the USBR? A. MWD has been allotted three generators, N5, N6, and N7 at Hoover Dam power plant, plus firm energy associated therewith, and half the power and energy available at Parker Dam, but one generator, N7, at Hoover Dam power plant and part of the firm energy at Hoover Dam has been released to other parties for many years. However, MWD has served notice of recapture of N7 to be effective on August 31, 1961.

Q. How much power does MWD have at present at Hoover Dam power plant? A. Its two units, N5 and N6, each have the capacity of 82,500 kw, making a total of 165,000 kw. However, the amount of power and energy actually available vary at times, depending on the water conditions.

Q. How much power and energy does MWD have at Parker Dam power plant? A. It has been allotted half the power and energy available at Parker Dam. Since the total capacity of Parker Dam power

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plant is 120,000 kw, the maximum entitlement is 60,000 kw. Again, the actual amount of power and energy available vary at times depending on water conditions.

Q. Does MWD have at times more power and energy available from Parker and Hoover Dams than it needs for its pumps? A. Yes.

Q. Does MWD sell any electric energy, unneeded by it, to Southern California Edison Company? A. It does.

Mr. Goldberg: Let me have that last, I missed that.

(Question and answer read.)

Mr. Goldberg: Thank you.

By Mr. Everett:

Q. Where is this electric energy delivered to Southern California Edison Company? A. At Hayfield substation.

Q. Does MWD have at times insufficient power and energy available from Parker and Hoover Dam power plants to operate its pumps? A. Yes.

Q. From whom does it get the needed power? A. From Southern California Edison Company at Hayfield.

Q. If MWD is allotted Hoover Dam and Parker Dam energy, how do you account for Davis Dam energy being received by it? A. It might be well to refer to the diagram, Exhibit

No. 2 for identification.

The tap on the 220 kv circuit at Parker Dam, which supplies Gene is between the incoming line from Davis and the other circuits at Parker Dam. Therefore, whenever energy is received at Parker Dam from Davis, simultaneously with a delivery to Gene, part or all of the energy delivered to Gene will be energy received from Davis.

Q. What period of time did your field examination cover? A. From July 1, 1954, through November 30, 1958.

Q. Mr. Miller, have you supervised the preparation of a tabulation showing the delivery of out-of-state energy by MWD to Southern California Edison Company at Hayfield substation? A. I have.

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Mr. Everett: Mr. Examiner, the staff wishes to offer for identification a tabulation entitled "Power Flow Data".

Presiding Examiner: It will be marked Exhibit No. 3 for identification.

(The document above referred to was marked Exhibit No. 3 for identification.)

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By Mr. Everett:

Q. Mr. Miller, is Exhibit No. 3 for identification the tabulation you have had prepared? A. It is.

Q. Will you please turn to page 75 of 105 of Exhibit No. 3 for identification? What do the data, Mr. Miller, on the first line under the heading "Day and Hour, 1955" signify? A. July 22, 1955, at 1 p. m.

Q. What does the "2", the figure "2" under this heading on the second line signify? A. The same day at 2 p. m. The date is not repeated for subsequent hours except on a carry-over from a previous page. This also applies to the "A" and "P" notations which respectively signify a. m. and p. m.

Q. What does the 12-N on the 16th line of page 75 of 105 signify? A. Twelve noon. Similarly, I have used 12-M to indicate 12 Midnight.

Q. Referring again to the first line, what do the figures 60 and 104 under the heading "Hayfield to Highgrove" signify? A. The rate of flow of energy from Hayfield substation to Highgrove substation in megawatts. The figure 60, under the subheading "½ Hr." means that the rate of flow is 60 megawatts, or 60,000 kilowatts at 12:30 p.m., one-half hours

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before the hour shown under the heading "Day and Hour 1955." The figure 104 under the heading "Hr." means

that the rate of flow was 104 megawatts or 104,000 kilowatts at 1 p. m.

Q. Continuing on this first line, what do the figures 48, 47 and 95 under the heading "Highgrove Substation Banks" signify? A. The rate of flow of energy from the Highgrove Substation 220 kv bus to the 66 kv bus for the hour shown. The figure "48" under the subheading "1A" means that the rate of flow was 48,000 kilowatts through Bank 1-A. The figure "47" under the subheading "2A" means that the rate of flow was 47,000 kilowatts through Bank 2A. The figure 95, which is the arithmetic sum of the other two figures under the heading means that the total rate of flow of energy from the 220 kv bus to the 66 kv bus at Highgrove was 95,000 kilowatts.

Q. Mr. Miller, what was the source of the figures 60, 104, 48, and 47 on the first line of page 75 of 105 of Exhibit 3 for identification? A. They were copied from station meter and temperature reading sheets of the Highgrove Substation of Southern California Edison Company.

Q. Was the same source used for the corresponding figures under the same headings for all days and hours on all the sheets of Exhibit 3 for identification? A. Yes.

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Q. Continuing with page 75 of 105 of Exhibit 3 for identification, what does the figure 130 on the first line, under the heading "Davis to Parker", signify? A. It signifies that the rate of flow of energy from Davis Power Plant to the 220 kv substation of Parker Power Plant was 130,000 kilowatts.

Q. Continuing on the first line, what does the figure 60, under the heading "Parker to M.W.D.", signify?

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A. It signifies that the rate of flow of energy from the 220 kv substation of Parker Power Plant to MWD at Gene was 60,000 kilowatts.

Q. What was the source of the figures 130 and 60 you have just described? A. They were copied from the records of the USBR at Parker Power Plant.

Q. Was the same source used for the corresponding figures under the same headings for all days and hours on all of the sheets of Exhibit 3 for identification? A. Yes.

Q. What does the statement "Gene Max Req 40.2 MW" on the upper righthand part of page 75 of 105 of Exhibit 3 for identification signify? A. It signifies that as of the dates shown on that page the pumps installed at the Gene pumping plant and the Intake pumping plant of the MWD, both of which are served from the

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substation at Gene, had a combined maximum installed load rating of 40.2 megawatts.

Q. Continuing on the first line of page 75 of 105 of Exhibit 3 for identification, what does the figure 19.8 under the heading "Davis-Parker-Camino" signify? A. It signifies that the rate of flow to Camino of energy generated at Davis Power Plant and possibly in part at Hoover Power Plant and transmitted via the 220 kv substation of Parker Power Plant was 19,800 kilowatts.

Mr. Bury: May I ask that that answer be repeated, please.

Presiding Examiner: Yes.

(Answer read.)

Mr. Bury: Thank you.

By Mr. Everett:

Q. What was the source of the figure 19.8, Mr. Miller? A. It is a calculated figure obtained by substract-

ing the Gene maximum requirement figure of 40.2 M.W. from the 60 M.W. figure under the heading "Parker to M.W.D."

Q. Can you explain for us the basis of this calculation? A. Referring to the diagram Exhibit 2 for identification, note a circuit from Davis past Parker and Gene to Camino. The interconnection point shown between Parker and Gene is the point where M.W.D. receives energy transmitted by the USBR from Parker. If the energy flow from Davis to Parker, as shown in the power flow data, Exhibit 3 for identification, is greater

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than the delivery from Parker to MWD near Gene, it is obvious that all the energy received by MWD near Gene was transmitted from Davis. Because of the lack of necessary records the actual load at Gene could not be determined. Instead the assumption has been made that the load at Gene at any hour was the maximum possible based on the rating of the pumps installed there at the time.

Upon this assumption, the amount of energy from Davis reaching Camino to mix with the energy transmitted directly from Hoover Power Plant is the difference between the Parker to MWD figure and the Gene maximum requirements.

From Camino, the mixture is transmitted to Iron Mountain, Eagle Mountain and Hayfield pumping plants and to the Southern California Edison Company at Hayfield substation.

Q. Was the same method used in calculating the corresponding figures under the same heading for all days and hours on all the sheets of Exhibit 3 for identification? A. Yes, subject to a modification when the Davis to Parker figure was less than the Parker to MWD figure.

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Q. What was this modification? A. The difference, as described before, was multiplied by the ratio of the Davis to Parker figure, to the Parker to MWD figure, since in such a case the flow to MWD over the Parker-Gene line was a mixture of energy transmitted from Davis and energy generated at Parker and/or energy generated in

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Arizona.

Q. Mr. Miller, what is the reason for the blank spaces under the last three headings in Exhibit 3 for identification? For example, page 49 of 105? A. No data was copied for hours when the Davis to Parker reading was zero or negative, or when the Parker to MWD reading was less than the Gene maximum requirements. Under these conditions no energy from Davis would flow to Camino and beyond.

Q. Mr. Miller, you testified that Hoover Dam electric energy and Davis Dam electric energy was delivered to the Southern California Edison Company at Hayfield. What did Southern California Edison Company do with this energy? A. It transmitted the energy 104.8 miles from Hayfield to Highgrove substation 220 kv bus. There all or part of the energy was transmitted via transformer banks 1A and 2A to the 66 kv bus at Highgrove substation. From the 66 kv bus the energy was transmitted to the outgoing circuits on the 66 kv bus. Over the circuits marked "W" and "E" on the diagram, Exhibit 2 for identification, some of this energy was transmitted by Southern California Edison Company 1.8 miles to the Colton substation 66 kv bus. From the Colton substation 66 kv bus Edison transmitted part of this energy to the Colton substation 11 kv bus and thence over the Globe Mills and Derby lines to the City of Colton substation where it stepped the voltage down to

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4 kv and sold the energy at wholesale to the city of Colton.

Q. What did the City of Colton do with the energy? A. The City of Colton sold the energy to its customers.

Q. Have you prepared a tabulation showing the kilowatt hour sales at wholesale by Southern California Edison Company to the City of Colton? A. Yes. Because of a difference in the amounts as given in the Annual Reports Form No. 1 to the Commission as respectively filed by the City of Colton and the Southern California Edison Company, I have prepared a tabulation showing the amounts shown by each.

Mr. Everett: Mr. Examiner, staff wishes to offer for identification a tabulation entitled "Sales at Wholesale of Electric Energy to the City of Colton by Southern California Edison Company."

Presiding Examiner: It will be marked Exhibit No. 4 for identification.

(The Document Referred to Was Marked Exhibit No. 4 for Identification.)

By Mr. Everett:

Q. Mr. Miller, is Exhibit marked No. 4 for identification the tabulation to which you refer? A. Yes.

Q. Returning to Exhibit No. 3 for identification, how were the hours shown in Exhibit 3 for identification selected?

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A. The selection was made only of hours when energy was delivered by M.W.D. to Southern California Edison Company at Hayfield, as shown on the records at the Southern California Edison Company's Highgrove substation. From such hours selection was as follows: For

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the first 11 months of 1958 hours during a week per month were selected in each of the first four months and all hours during the other seven months. For the year 1957, hours during a nine-day period in April and a twelve-day period in August.

For the year 1956, hours during a week in July and all hours during any day having at least one hour showing the delivery of Davis Power Plant energy to Hayfield as determined from a study of the Parker Dam Power Plant records.

For the year 1955, hours during selected days in January and February and all hours during any day having at least one hour showing the delivery of Davis Power Plant energy to Hayfield; and for the last six months of the year 1954, all hours.

Q. Would you regard these hours as representative? A. Yes. They are representative of hours of normal operating conditions which have recurred through the years.

Q. Referring to the tabulation of power flow data, Exhibit 3 for identification, how many hours does Exhibit 3 for identification show the delivery of electric energy generated in Hoover Power Plant and Davis Power Plant to the City of Colton?

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A. It shows the delivery of electric energy generated in the Hoover Power Plant to the City of Colton during 596 hours in the last six months of 1954, 1,338 hours in the period studied in 1955, 270 hours in the period studied in 1956, 199 hours in the period studied in 1957, and 1,115 hours in the period studied in 1958. These deliveries included a component of energy generated in Davis Power Plant during 341 hours in 1954, 746 hours in 1955, and 31 hours in 1956.

Mr. Everett: Mr. Examiner, the staff now requests that Exhibits Nos. 1, 2, 3 and 4 for identification be received in evidence.

Mr. Bury: I would really like to have some things decided about my feeling on the admissibility of these exhibits. However I would like to reserve, if we can, your ruling until I have completed cross-examination. I think we may through that cross-examination develop the basis on which a ruling may more appropriately be made.

Presiding Examiner: I will reserve ruling until after the cross-examination.

Mr. Everett: Mr. Examiner, Mr. Miller is now available for cross-examination.

Presiding Examiner: Are you ready?

Mr. Bury: I think again, at this point we have perhaps a procedural question of what is Colton's position at this point with respect to this witness. If, as the Examiner ruled this

morning, Colton is the moving party with the burden of proof, it would appear appropriate to me that they would not be permitted to cross-examine this witness. I certainly want to know what procedure is going to be followed before I proceed to cross-examine him.

Presiding Examiner: Do you have any questions of this witness, Mr. Goldberg?

Mr. Goldberg: We certainly like the testimony we have heard, there is no denying that. I imagine Mr. Bury perceives that. The fact that we like it, it is favorable to us, doesn't deprive us of an opportunity to ask the witness questions and the record should show it is cross-examination. We have a few questions.

Presiding Examiner: You do have?

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Mr. Goldberg: Yes.

Presiding Examiner: Are you ready to proceed with them at this time?

Mr. Goldberg: I think so.

Presiding Examiner: You may proceed, then.

Mr. Goldberg: Is Mr. Bury going to proceed with cross-examination today?

Mr. Bury: I am ready to proceed with cross-examination of the witness at this time and I think of course if you are going to ask questions of him then I would best wait and cross-examine him on the testimony developed both by staff counsel and

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yourself.

Presiding Examiner: I think that would be correct, Mr. Bury.

Mr. Bury: Thank you.

Cross-Examination

By Mr. Goldberg:

Q. Mr. Miller, referring to Exhibit No. 1 for identification, am I correct that Exhibit No. 1 does not reflect all of the facilities of Southern California Edison Company which it employs to transmit electric energy from out of the State of California into California? A. It shows all the facilities to which I have testified.

Q. Yes.

I take it that in submitting the Exhibit No. 1, Exhibit No. 1 portrays in that form the facilities involved in the transmission of energy originating out of the State of California down to the City of Colton; that is right, isn't it? A. I didn't get your question.

Q. Would you like to have it repeated?.

Presiding Examiner: Would you read it, please, Mr. Reporter.

(Question read.)

The Witness: It shows the path over which energy from out of state is transmitted to the City of Colton via Hayfield and Highgrove.

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Mr. Goldberg: Yes.

By Mr. Goldberg:

Q. And you know, do you not, that the Southern California Edison Company owns and operates other facilities, not shown on the map, which transmits energy originating out of the State of California into California, is that right?

Mr. Everett: Mr. Examiner, the Staff objects to that line of questioning. This is cross-examination and its scope should be no broader than the scope of the direct examination.

Presiding Examiner: Will you read the questions to me, Mr. Reporter.

(Question read.)

Presiding Examiner: The objection is sustained.

Mr. Goldberg: Mr. Examiner, am I not entitled to develop from this witness the facilities owned and operated by Southern California Edison?

Presiding Examiner: If you trace the energy to the City of Colton.

Mr. Goldberg: I think, Mr. Examiner, that I am entitled to develop on the record the interstate operations of this company, even if the City of Colton sale were not involved. After all, we have here a contention by Southern California Edison that it is only a local utility, confining its operations to the state of California. And I think I am entitled to show what the fact really is.

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Now, here is an exhibit that is incomplete. It does not show all the interstate facilities of Southern California Edison Company and I think I am entitled to shew that.

Mr. Everett: Mr. Examiner, may the Staff be heard?

Mr. Miller, as I recall his direct testimony, said that this map was designed to show the geographical locations of certain places and he named those places. He did not state that this map attempted to show anything other than the location of those places that he named. He did not represent that the exhibit did show or was intended to show all the facilities of the Southern California Edison Company.

Presiding Examiner: The other facilities of Southern California Edison and other sales are certainly not at issue in this hearing. The only issue is with regard to the City of Colton.

Mr. Bury: I have really no particular comment to make on this, except that we would spend an awful lot of time——

Presiding Examiner: The objection has been sustained to the question.

Mr. Bury: All right. Thank you.

By Mr. Goldberg:

Q. Mr. Miller, upon the conclusion of your field examination you prepared a report jointly with a Mr. Charles N. Harman, is that right? I will show it to you to refresh your recollection if you have some trouble remembering it.

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Mr. Everett: Mr. Examiner, the Staff objects to that question. There again the counsel for the City is going outside the scope of the direct examination.

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Mr. Goldberg: I am about to ask him about his field investigation. That is entirely within the scope of his testimony.

Presiding Examiner: The objection is overruled.

By Mr. Goldberg:

Q. Am I correct you prepared jointly with Mr. Harman a report of your field analysis? A. I did.

Presiding Examiner: Who is Mr. Harman, Mr. Goldberg?

By Mr. Goldberg:

Q. Would you identify for the record Mr. Harman? A. Mr. Harman is my supervisor.

Q. He is on the staff of the Federal Power Commission? A. Yes.

Q. Do you recognize the document that I put before you as the report you prepared jointly with Mr. Harman? A. I do.

Mr. Everett: Mr. Examiner, Staff at this time would like to ask a question of Mr. Goldberg, namely we would like to inquire whether he intends to offer this document in evidence.

Mr. Goldberg: Well, I will meet that when I have to. I don't think I am at that point yet.

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By Mr. Goldberg:

Q. Is it not the fact, Mr. Miller, directing your attention to page 6 of your report, that you there state that, in your field examination—not using your exact words—you had basic data which you used in your analysis of the flow of interstate energy from Hoover Dam Power Plant via Chino substation to the City of Colton substation; is that right? A. Would you mind showing me that?

Q. (Indicating) The last paragraph on page 6 of your report.

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Mr. Everett: Mr. Examiner, the Staff must object again. The counsel for the City is not confining himself to the facts brought out by Mr. Miller on direct examination.

Mr. Goldberg: The witness testified, Mr. Examiner, with respect to his field examination and I am entitled to explore what his field examination covered.

Presiding Examiner: I think the objection is well taken, Mr. Goldberg, unless and until you have identified the document which you have shown to the witness.

Mr. Goldberg: I will be glad to identify it, Mr. Examiner, for purposes of using it in the record, but that doesn't necessarily mean that I have to offer it in evidence. I take it the Examiner is only concerned with having the record clear as to what we are talking about.

Presiding Examiner: Yes, so that other parties may be

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afforded the opportunity to examine the witness from the same document which you are examining from.

Mr. Goldberg: Perhaps I can even take care of that without marking it.

By Mr. Goldberg:

Q. Mr. Miller, do you know whether this report was served on all parties to this proceeding? A. I don't know what you mean by "served".

Q. Made available to all parties to the proceeding? A. I believe it was.

Presiding Examiner: Mr. Goldberg, is that a document referred to in the Commission's Notice?

Mr. Goldberg: Yes. I am pretty sure it is. May I just look at the Order?

Yes, that is exactly the document.

Presiding Examiner: This is the document referred to in the last paragraph of the front side of the Order fixing

the hearing wherein it says "The results of that examination are embodied in a staff engineering report which was served upon Petitioner and Edison"?

Mr. Goldberg: That is it exactly.

Presiding Examiner: That is the document you have now?

Mr. Goldberg: That is the document I have in my hand and I think I can state without fear of contradiction that it is a document that has been carefully studied by Southern California

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Edison, by Staff counsel, by us, was the subject of correspondence and of a conference.

Presiding Examiner: The objection is overruled.

Mr. Bury: What is the pending question?

Mr. Goldberg: Perhaps in order to save time I will restate it.

By Mr. Goldberg:

Q. Is it not a fact, Mr. Miller, that in the report you prepared jointly with Mr. Harman, at page 6 thereof you state that you had data analyzing the flow of interstate energy from the Hoover Dam Power Plant via Chino substation to the City of Colton substation? A. Would you mind reading that question?

Presiding Examiner: Will you read the question, Mr. Reporter.

(Question read.)

The Witness: Yes.

By Mr. Goldberg:

Q. And do you not also state there that although your analysis conducted in Washington after the field examination showed that this data to which I have just referred also confirmed the delivery by Edison of interstate energy

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to the City of Colton's distribution system, it was decided that ample basis for jurisdiction was found in the analysis of the first set of data without the necessity of presenting the results

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derived from the second set of data; does it not so state? A. Yes.

Q. Now this second set of data that we are talking about are the paths that you have traced this morning in your testimony, is that right? A. What is that?

Q. The second set of data—I am sorry, I misstated it. The data that you have referred to in your testimony today is the data you have described as involved in the paths of flow you have referred to in your testimony this morning, right? A. That is right.

Q. But you did not, this morning, describe the data or path of flow involved in this other data, is that right, through Chino? A. That is right.

Q. Now, the energy involved in this path of flow which you did not describe, to which we have just referred in the report, that is energy originating at Hoover, is it not? A. In part.

Q. Generated by Southern California Edison? A. In part.

Q. Through the operation of generators allotted to it? A. I didn't say that.

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Q. Was any part of it generated by Southern California Edison by the use of generators allotted to it? A. Yes.

Q. These generators are on the Arizona side, is that right? A. That is right.

Q. And this energy moves from Hoover over high-voltage lines to California, is that right? A. That is right.

Q. Are any of those high-voltage lines over which this energy moves to California owned and operated by Southern California Edison? A. Yes.

Q. And are not part of those lines owned and operated by Southern California Edison located in Nevada? A. That is right.

Q. And those lines come down into Chino and carry the energy down into Chino, is that right? A. That is energy transmitted over those lines——

Q. To Chino. A. To Chino.

Q. Is that the Chino that we see noted on Exhibit No. 1? I see the name Chino with a substation designation on Exhibit No. 1. Is that the Chino we are talking about? A. That is right.

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Q. Now, look at Exhibit No. 2. Is it the Chino in the middle part of the schematic diagram? A. It is.

Q. Now, is there a connection from Chino to the Highgrove substation? A. There is.

Presiding Examiner: Mr. Goldberg, would this be a good point to take the noon recess?

Mr. Goldberg: Very good point. Thank you very much.

Presiding Examiner: The Court will be in recess until 2 o'clock.

(Whereupon, at 12:29 o'clock p.m., the hearing was recessed, to reconvene at 2:00 o'clock p.m., the same day.)

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AFTERNOON SESSION—2 PM

Presiding Examiner: The hearing will come to order, please.

Are you ready to proceed, Mr. Goldberg?

Mr. Goldberg: In just one moment.

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Harold E. Miller

resumed the stand as a witness, having been first duly sworn, and testified further as follows:

Cross-Examination (cont'd.)

By Mr. Goldberg:

Q. Mr. Miller, I wonder if you have the information to answer this question: You have indicated that the Metropolitan Water District sells or delivers electric energy to Southern California Edison at Hayfield. Is the energy that is delivered at Hayfield by Metropolitan Water District energy which is all owned by Southern California Edison, or is there a sale, also, at that point?

Mr. Bury: I would like to object to that question, on the grounds it is certainly calling for legal conclusions as to ownership and sales, something which this witness is not qualified to do.

Mr. Goldberg: I don't want a legal conclusion, of course.

Mr. Bury: All right.

Mr. Goldberg: I just want an understanding from him just what he understands the situation is.

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Mr. Bury: Fine.

Presiding Examiner: As I understand, the witness testified in answer to a question from the staff, the Metropolitan Water District purchased power from the Hoover Dam, and what they didn't use at Iron Mountain and Eagle Mountain was delivered to Edison at Hayfield.

Mr. Goldberg: According to my notes, he testified that the Metropolitan Water District sells electric energy to Southern California Edison, and that was followed by testimony to the effect that there is a delivery at Hayfield by Metropolitan Water District.

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Presiding Examiner: The objection is overruled.

The Witness: May I hear the question?

(Question read.)

Mr. Goldberg: That is not a very good question. Let me withdraw it, start over and take it in steps.

By Mr. Goldberg:

Q. You have described the flow of energy from Hoover over facilties that are reflected in two exhibits, Nos. 1 and 2? Now, the energy which is moving from Hoover over facilities that are reflected in two exhibits, owned by Southern California Edison?

Mr. Bury: I am sorry, I will have to object again. I think the question of ownership would clearly be a legal conclusion. The best evidence of that would be the contract.

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Presiding Examiner: The objection is overruled.

The Witness: It is my understanding that the energy delivered by MWD at Hayfield is energy owned by Metropolitan Water District.

By Mr. Goldberg:

Q. Is it sold at Hayfield by Metropolitan Water District to Southern California Edison? A. I would like to refer to one of the annual reports of Southern California Edison Company before I answer that question. I have them here, I believe.

Q. Is it one that you have available to you? I have no objection to you refreshing your recollection by looking at it. A. There is a sale of energy to Southern California Edison by MWD. I have the annual report of the Southern California Edison Company for the year 1958, and on page 79-A they speak of a Metropolitan Water District

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re-sale contract, and they also speak of energy charges for purchased power, and one of the items refers to a certain number of KWH at a firm rate, with MWD in parentheses after it.

Q. This takes place at Hayfield, does it, as far as you know? A. I would now need the power system statement of the Southern California Edison Company for the same year.

Mr. Bury: Excuse me for one moment, Mr. Miller. You

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referred to page 79-A. At what point on that page were you referring to? A. On page 79-A, the top of the page speaks, under purchased power contract 738.00, Hoover, 1958, energy charges, 309541.66, paren MWD, and then gives the amount of money involved——

Mr. Bury: I see.

The Witness: Only part of the energy was delivered at Hayfield.

By Mr. Goldberg:

Q. By that you mean that only part of the energy sold by MWD to Southern California Edison was sold at Hayfield? A. There is a difficulty there, Mr. Goldberg. While all the energy is described in kilowatt hours, measured that way, the energy delivered at Hayfield is in the form of electric energy. Energy delivered at Hoover is in the form of hydraulic energy, even though it is measured in electrical terms.

Q. Now then, just so that we get the record absolutely clear, there is a sale by MWD at Hayfield to Southern California Edison; am I right so far? A. Yes.

Q. All right. Now, is there another sale by MWD to Southern California Edison at Hoover? A. Sale of what?

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Q. Of energy. A. Electric energy?

Q. Of electric—let's say of electric energy, first. A. At Hoover there is no sale of electric energy by MWD to Southern California Edison.

Q. There is a sale of this hydraulic energy? A. That is true. I would describe it as such.

Q. Which is convertible into electrical energy? A. All energy is convertible.

Q. Is it converted into electric energy? A. It is.

Q. And is that the objective of Southern California Edison buying the hydraulic energy? A. I don't know.

Mr. Bury: Excuse me. I object to asking this witness what the objectives of Edison are.

Presiding Examiner: The witness says he doesn't know, and the objection is sustained.

By Mr. Goldberg:

Q. Is there a sale of electrical energy at Hoover by the U. S. to Southern California Edison? A. I would say yes.

Q. And doesn't part of that energy come down over the facilities shown in the schematic diagram, Exhibit No. 2, and Exhibit No. 1?

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A. No.

Q. It comes down over those other facilities we were talking about this morning? A. That is right.

Q. Is there a sale by the U. S. to Edison at Hoover of hydraulic energy? A. That would require me to know exactly what the contracts say.

Q. I see. You are not in a position to say? A. No.

Q. Do you know whether the facilities owned by Metropolitan Water District, shown on Exhibit No. 1, from

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Hoover down to Hayfield, are operated by Metropolitan Water District for the joint benefit of themselves and Southern California Edison? A. All I can tell you is that Metropolitan Water District operates those facilities.

Q. Do they collect any rental from Southern California Edison for the operation of those facilities? A. I don't know.

Mr. Goldberg: We have no other questions of Mr. Miller.

Presiding Examiner: Mr. Bury?

Mr. Bury: Just one question, please.

Presiding Examiner: Mr. Bury, excuse me.

Mr. Bury: Yes.

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Presiding Examiner: Does the California Commission counsel have any questions?

Mr. Roos: Not at this time, Mr. Examiner.

Presiding Examiner: Your witness then——

Mr. Goldberg: What does that mean, "not at this time"? That he has no cross-examination of Mr. Miller, or that he is planning to cross-examine Mr. Miller at some other time?

Mr. Roos: I may desire to cross-examine Mr. Miller after Mr. Bury is through.

Mr. Goldberg: I thought the Examiner had called upon the California Commission to proceed now.

Presiding Examiner: I asked him if he had any questions, and he said "not at this time".

Mr. Goldberg: I will just bide my objection, then, until we see what happens.

By Mr. Bury:

Q. Mr. Miller, during some questions on cross-examination by Mr. Goldberg, he made reference to certain

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statements in the staff engineering report, particularly a statement at the bottom of page six, that after gathering certain basic data and the analysis in Washington, the data confirms delivery of interstate energy over lines from Chino. Was the analysis or study which you made of that data of the same type which you made, reflected in Exhibit 3? A. What do you mean by the same type?

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Q. Well, did you collect the same data, and analyze it in the same way and prepare a study in the same manner in which you did with respect to the so-called first set of basic data?

Mr. Everett: Mr. Examiner, the staff wishes to object to that question.

Mr. Miller hasn't given any testimony on direct examination as to analysis of the data to which Mr. Bury has referred.

Mr. Bury: Excuse me. I will rephrase the question, then.

Presiding Examiner: Mr. Everett, I would consider, I think, the examination of the witness Miller by counsel for the City of Colton as more or less direct testimony, rather than cross-examination. In other words, I assumed from the examination of the witness that, for the most part, they intended at least, perhaps, to make him their witness.

Mr. Bury: I have, I think, then, just one question.

By Mr. Bury:

Q. Mr. Miller, do you rely, in reaching the conclusions you have expressed during your direct testimony regarding power flows, either on the so-called second set of data or its analysis?

Mr. Goldberg: May I have that question? I missed part of it.

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Presiding Examiner: Will you read the question, Mr. Reporter?

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(Question read.)

The Witness: I——

Mr. Everett: Excuse me, Mr. Examiner. Has Mr. Bury made clear to Mr. Miller what he means by the "second set of data"?

Presiding Examiner: I thought, Mr. Everett, he referred to page six, in the first question. I didn't hear it in the second question. That is, page six of the staff engineering report. At the bottom of that page I find the heading "Energy Flow Data and Results", and I assume the second paragraph under that heading is the basis for the question.

Mr. Bury: That is correct.

The Witness: May I look at that page so I am sure I answer correctly? I did not rely on the second set of basic data at all.

By Mr. Bury:

Q. Or its analysis? A. Or its analysis.

Q. Thank you. Mr. Miller, you have responded to several questions with respect to the sales of energy, either electrical or hydraulic, between the Metropolitan Water District of Southern California and the Southern California Edison Company. Am I correct that you are merely testifying from your understanding, from what you have learned from your investigation, and are not intending to express any opinion as to who may be the

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buyer or seller under those contracts? A. I have relied upon the reports of the Southern California Edison Company in Form 1 and the Power System Statement Form 12, in which they have described that they purchase energy

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from MWD, some of which is delivered at Hayfield and some of which is energy made available at Hoover to be generated in the generators which supply the energy to Southern California Edison Company at Hoover.

Q. I take it from that, then, that you did not rely on any analysis of the contracts involved? A. I didn't read the contracts.

Q. Thank you. Mr. Miller, in describing the sources of information used by you to prepare the single-line diagram, which is Exhibit No. 2, you mentioned that you had referred to a system single-line diagram of Southern California Edison Company and to a diagram of, I believe you title it the Colton Switching Area, or Colton Switching Center. Are those two sources to which you referred those items which appear in Edison's Form 12 power system statements, first the single-line system diagram, being the second page following page 29, which is designated Schedule 18, system maps and diagrams?

Perhaps I can handle it this way, Mr. Miller: I show you a copy of the power system statement Form 12 for the year 1958, and turn to page 29, which is entitled "Schedule 18, System Maps and Diagrams."

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Immediately following that is a large map, and the next item following is a sheet which bears the legend "System Single-Line Diagram". Is that the diagram you referred to as one of the sources of your preparation of Exhibit 2? A. I actually referred to the system single-line diagram No. 71036-3, which was submitted with the '57 report.

Q. I see. A. But——

Q. The one I have shown you here bears the number 71036-5, and is attached to the '58 report? A. Right.

Q. I see. And following that diagram in the Form 12, the third page following the system single-line diagram,

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to which we have just referred, is a sheet which bears the legend "Colton Switching Center 12 kv Lines." Is this the other diagrams you referred to as one of the sources of information for the preparation of Exhibit 2, either this or one filed with a power system statement for an earlier year? A. I believe I used the one filed with the power system statement of '57, in which year the lines were called 11 kv lines, whereas on this diagram they are called 12 kv lines.

Q. These references to 11 or 12 kv, those are just nominal ratings, aren't they? A. That is right.

Q. I see.

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Mr. Bury: If this would be an appropriate time, I would like to request that there be incorporated in this record by reference the system single-line diagram, referred to, and the Colton Switching Center diagram referred to, which appear in Edison's Form 12, power system statements for—at least—the year '57, to which Mr. Miller indicated he referred.

Presiding Examiner: You want them marked items by reference, Mr. Bury?

Mr. Bury: I think that might be convenient.

Presiding Examiner: All right. If you will describe the first one for the record.

Mr. Bury: All right. We would request, then, that there be incorporated by reference in this record as Item "A" the system single-line diagram, which bears the number 71036-3, and which appears in the power system statement, Form 12, filed by Southern California Edison Company for the year 1957.

Presiding Examiner: It will be marked Item "A" by reference, Mr. Bury.

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(The Document Above Referred to Was Identified as Item "A" by Reference.)

Mr. Bury: We would like marked as Item "B" by reference a diagram bearing the legend "Colton Switching Center, 11 kv Lines", which appears in the same power system statement three pages following the single-line diagram just referred to as Item "A".

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Presiding Examiner: That will be marked Item "B" by reference.

(The Document Above Referred to Was Identified as Item "B" by Reference.)

Mr. Goldberg: May I make an inquiry? Did the witness say he utilized either or both of them?

Mr. Bury: Yes. It is my understanding of his testimony that he used those in the preparation of his exhibit.

Mr. Goldberg: Is that the fact?

The Witness: That is right.

Mr. Goldberg: Thank you.

By Mr. Bury:

Q. Mr. Miller, in the course of your preparation or investigation, did you rely upon the system single-line diagram or the Colton Switching Center diagram filed in power system statements for other years? A. I have examined the various diagrams going back through the years, but at the time I was working up the data, the 1957 power system statement was the latest one available and I used the diagrams in that report, plus any diagrams I had gotten from the company when I was out on the field examination. I can't tell you at this present moment—I am sure of the single-line system diagram 71036-3, I am fairly confident that that appeared in the '57 report, but I can't be sure of whether the exact revision number appears—the same one appears in

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that report or whether it involved a diagram I received from company personnel when I was on the field examination.

Q. I see.

Mr. Bury: Mr. Examiner, I might just explain, I didn't want to leave out any that he thought were necessary. I think for our purposes these two to which we have made specific reference would be sufficient. But if there is any need for reference to earlier or later reports, I thought we would develop it now and bring them in if it was thought necessary.

By Mr. Bury:

Q. Mr. Miller, directing your attention to Parker power plant owned and operated by the USBR, you testified, did you not, that all of those facilities, all of the generators and electrical facilities are located within the State of California? A. The generators are located in the State of California at Parker Dam power plant.

Q. And the switch yard? A. The switch yard is in California.

Q. In describing Parker power plant you made reference to a capacity figure of 120 megawatts. Is that a nameplate rating? A. I believe that is.

Q. Are you aware of what the effective operating capacity of that plant is?

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A. What do you mean by "effective"?

Q. I appreciate those are terms which sometimes require definition. Maybe we can save some time if I asked the question this way: In your studies did you look at and study the records for values, for generation at Parker power plant? A. I did look at the power system state-

ment submitted by the Colorado River system from the USBR. The exact name I used earlier, and I would like to give it to you.

Colorado System, Lower Basin, USBR, and I believe they showed that the nameplate capacity is 120,000. I don't recall at this moment, although I probably have seen it, exactly what they show as the capability of the units.

Q. I see. In other words, you do not know whether or not the capability of those units may be somewhat lower than that 120,000 megawatt nameplate figure? A. I don't know if they are lower than 120.

Q. Referring now to Exhibit 3, turning to page 44 of 105 of that Exhibit 3, and to the tenth line, which in the first column is identified as 1956, April 30, 9 p.m.

Mr. Goldberg: April what?

Mr. Bury: We are talking about April 30, 1956, 9 p.m.

By Mr. Bury:

Q. Mr. Miller, is that the last time the period covered by Exhibit 3, for which you show any values in the last three columns?

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A. That is correct.

Mr. Everett: A question for clarification, Mr. Examiner. Does Mr. Bury mean, by the last time, you mean in point of day, not in point of pagination of this exhibit?

Mr. Bury: No. What I was referring to: As I understand this exhibit, the time period covered is roughly July 1, 1954 through November 30, 1958.

By Mr. Bury:

Q. Is that not correct? A. That is right.

Mr. Bury: And on the date of April 30, 1956, is this the last time in which any information is shown in this

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exhibit for Davis to Parker, Parker to MWD, or Davis-Parker-Camino, those columns? A. Yes.

Q. Do you know when Davis power plant came into operation, Mr. Miller? A. It may have been—I am not sure, but around 1952, I would estimate.

Q. You made references to purchases by MWD of half of the output of Parker power plant. Do you know from what time that purchase commenced? A. I didn't get the last part of your question.

Q. Do you know what time that purchase by MWD of half of the output of the Parker power plant commenced?

A. It commenced with the initiation of generation at the plant.

Q. In the manner or by or through the facilities described in Exhibit 1? A. Some of those facilities were not in existence. Davis Dam was not in operation at the time Parker Dam was started—started operation, so that the line shown from Hoover to Davis to Parker was not in existence.

Q. Prior to Davis' operation, which you say is about 1952? A. That is a rough guess.

Mr. Bury: I might indicate, if it is any assistance, that we have information which shows it is June of 1951, which we can submit.

By Mr. Bury:

Q. I am now directing your attention to Exhibit 1 in what you have shown there as 220 kv facilities from Parker power plant to Gene, and ask you if you know what time those 220 kv facilities have been in existence. A. I have known, but I couldn't tell you right now. They

were in existence for the period since '54 to November, '58.

Q. Yes. You determined that from your investigation? A. That is right.

Q. Mr. Miller, in your preparation for this proceeding,

are the values shown in Exhibit 3, on each page, in the second and third columns, that is, those columns entitled "Hayfield to Highgrove" and "Highgrove Banks 1A and 2A", the only megawatt readings which you obtained from Highgrove substation?

Mr. Goldberg: May we have that question? I lose it——

Presiding Examiner: Yes. Will you read the question, Mr. Reporter?

(Question read.)

The Witness: That is correct. I may point out to you at this point that the total reading, of course, is derived by simple addition of the figures in the third column, as you called it.

By Mr. Bury:

Q. And what those figures represent, or what these figures are, are copies of the records of the Southern California Edison Company, readings of meters? A. That is right.

Q. That is, this exhibit represents a copy of Edison records; is that correct? A. The data shown under "Hayfield to Highgrove" and under "Highgrove substation Banks 1A and 2A" were copied from the Edison Company records.

Q. You have testified these figures represented the flow of power. Is it not more correct to state that these

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figures represent records of meter readings? A. I don't understand that question.

Q. All right. Let's drop it.

Presiding Examiner: Mr. Bury, would there be any question but what your meter readings reflect the flow of power?

Mr. Bury: I might express for the record, as part of the preliminaries to this proceeding, Edison had prepared to stipulate—and are now, of course—that what is in Exhibit 3, in those two columns to which I referred, are true and correct copies of Edison records. Those are records of meters at those locations, to which he has testified. The stipulation does not extend to the figures shown in subsequent columns.

By Mr. Bury:

Q. Mr. Miller, referring to Exhibit 1, the map, it is correct, is it not, that this map only purports to represent portions of the electric systems of the U.S. Bureau of Reclamation or the Metropolitan Water District or of Southern California Edison Company, and only portions? A. With the qualification that it is possible that this map may show all the facilities of MWD, I would say yes, with respect to USBR and Southern California Edison Company.

Q. With respect to Exhibit 2, the diagram; this diagram only purports to represent portions of the USBR, or Edison systems? A. That is correct.

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Mr. Bury: That is all the questions I have.

Presiding Examiner: Any redirect, Mr. Everett?

Mr. Everett: Just a moment, please, Mr. Examiner.

Mr. Goldberg: I would like to ask a question that I should have asked, but I will wait until Mr. Roos is finished.

Presiding Examiner: Mr. Roos, do you have any questions?

Mr. Roos: No, I have no questions.

By Mr. Goldberg:

Q. You referred, Mr. Miller, to a sale of hydraulic energy. Where is that hydraulic energy converted into electrical energy? Is it at Hoover? A. It is.

Q. And in the form of electrical energy it is then transmitted over MWD's lines down to Hayfield? A. No.

Q. Where is it transmitted to? A. When I was refering to hydraulic energy I was referring to energy made available at Hoover by MWD, which is generated in generators that normally supply energy to Southern California Edison Company at Hoover, and it is then transmitted by Southern California Edison Company.

Q. I see. Again, over those facilities we had referred to this morning? A. That is correct.

Mr. Goldberg: I see.

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By Mr. Bury:

Q. Meaning via Chino? A. Via Chino.

Mr. Goldberg: Thank you.

Redirect Examination

By Mr. Everett:

Q. Mr. Miller, Mr. Bury asked you about the data and tabulations appearing in the power flow data tabulation, Exhibit No. 3 for identification, and specifically he asked you about the data in the columns entitled "Hayfield to

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Highgrove" and the columns entitled "Highgrove Substation Banks". Now, I understood you to say in response to Mr. Bury's question that the data in these columns which I have just mentioned came from the records of the Southern California Edison Company? A. That is correct.

Q. What does this data, which now appears in this Exhibit No. 3 for identification, and which came from Edison's records, purport to show? A. They are meter readings showing the rate of flow of electric energy at the time they were taken.

Mr. Everett: No further questions, Mr. Examiner.

Presiding Examiner: Thank you, Mr. Miller. You are excused.

(Witness excused.)

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Presiding Examiner: Call your next witness.

Mr. Everett: Mr. Examiner, the Staff does not presently propose to call any additional witnesses but, as indicated in its opening statement, the Staff believes it does have an obligation to take such action as is necessary in this hearing to insure development of all the facts which are necessary for the disposition of all the issues in this proceeding.

The Staff's understanding is that the facts relating to other issues which have arisen out of the City's petition and the Company's answer to that petition will be presented by the parties to this proceeding.

Presiding Examiner: Thank you, Mr. Everett.

Mr. Cragun: You have some exhibits.

Mr. Everett: Yes. Thank you for reminding me.

Mr. Examiner, the Staff now requests that the Exhibits Nos. 1, 2, 3 and 4 for identification be received in evidence.

Presiding Examiner: Mr. Bury?

Mr. Bury: My objection to these is very brief. We have no objection to Exhibit 4. We object to Exhibit 1 and Exhibit 2 for the reason that they are incomplete, so incomplete as to be misleading.

Presiding Examiner: Let me ask you in that connection: You are objecting to them as being incomplete. I don't understand that. What do you mean by "incomplete"?

Mr. Bury: The witness has testified that they show only

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portions of the—the map only shows portions of the electric systems of USBR and Colton as does the single line diagram.

Presiding Examiner: They show what? I didn't understand your statement. I didn't hear it, rather.

Mr. Bury: I am sorry. The witness testified on cross-examination that these only purport to represent portions of these facilities, either geographically or schematically, and admittedly they are not complete. We believe for that reason they are misleading and therefore incompetent.

We have not debated their accuracy to the extent they purport to show portions.

Mr. Goldberg: Mr. Examiner——

Presiding Examiner: Did that complete your statement?

Mr. Bury: That is the only statement I have.

Mr. Goldberg: Will Mr. Bury enlighten us wherein they are incomplete and wherein what in his opinion has been omitted is material or relevant to the issues? He simply says they are incomplete.

Presiding Examiner: I asked him. I told him I didn't understand what he meant by incomplete and he is the

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one who made the objection to your question in the beginning. The objection is overruled and Exhibits 1, 2, 3 and 4 will be admitted in evidence at this time.

(The documents heretofore marked Exhibits 1, 2, 3 and 4 for identification were received in evidence.)

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Presiding Examiner: Now, do you have some witnesses for the City of Colton?

Mr. Cragun: Yes, Mr. Examiner. The City of Colton would like to call Mr. Fred A. Sack.

Frederick A. Sack

was called as a witness and, after being first duly sworn, was examined and testified as follows:

Direct Examination
By Mr. Cragun:

Q. Will you state your name and address? A. Frederick A. Sack, 901 Grand Avenue, Colton, California.

Q. Will you speak loud enough so that we can hear you in the back of the room, please? What is your occupation? A. Superintendent of the Electrical Utility, City of Colton.

Q. Where is the City of Colton located? A. I would say probably 53, 54 miles east of Los Angeles and about 150 miles from the Nevada line in a northeasterly direction.

Q. In what county is it located? A. San Bernardino.

Q. Will you please state your educational background? A. I attended the State Teachers College in Milwaukee for

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one year and the University of Wisconsin for two and a half years.

Q. What did you study at the University of Wisconsin? A. Electrical engineering.

Q. When were you in attendance at the University of Wisconsin? A. 1935 through '39, through part of '39,

Q. After you left school what did you do? A. I went to work for Hospital Equipment Company in Madison, Wisconsin.

Q. What was your work there? A. Largely experimental, in hospital equipment problems. After that I went to San Diego for Consolidated Vultee, and a very short stay——

Q. What was your position at Consolidated Vultee? A. I started on the drafting board but when the war ended I was assistant supervisor of plant engineering.

Q. To what extent, if at all, did that work in plant involve electrical engineering? A. Well, all the electrical facilities from our purchase of power at 12-5 kv at San Diego Power and Electric down to the last outlet.

Q. How long did you stay with Consolidated Vultee? A. September of '45 when the war ended, right after the war ended.

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Q. Then where did you go? A. A short stay at Solar Aircraft, then I went to the Division of Architecture and Engineering at UCLA.

Q. UCLA is the University of California, is it? A. Right, at Los Angeles.

Q. What was your employment with the University of California, Los Angeles? A. Coordination of the archi-

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tecture and engineering work being done by architects—to coordinate it with the requirements of the University on the campus expansion program.

Q. How long were you with the University of California? A. Between two and a half and three years.

Q. And then what did you do? A. Well, for a short stay after, Federal Electric Products Company, I helped them set up their plant in Los Angeles, and because of illness we went back to the Midwest, for a short stay in Wisconsin, and then back to Colorado.

Q. When did you go to Colorado? A. 1950.

Q. Whereabouts in Colorado did you go? A. Lajunta.

Q. What did you do in Lajunta, Colorado? A. Superintendent of Municipal Utilities for the City, including electric and water.

Q. How long were you at Lajunta?

A. Five years.

Q. Thereafter what did you do? A. Well, then I went to Rocketdyne Jet Propulsion Laboratory. That is at Kenova Park, California.

Q. What was your position with Rocketdyne? A. Electrical facilities engineer with the Industrial Engineering Department

Q. What is a facilities engineer? A. That is right, a facilities engineer. They take care of the facilities, electric, gas, water, sewer, et cetera. Mine was electric.

Q. To what extent were your duties there concerned with electrical engineering matters? A. Working on the design of test facilities from pump test drives, from 25,000 horsepower on down to, again, the last little outlet, somewhere.

Q. How long were you connected with them? A. A little less than a year. Then I went with the Ramo-Wooldridge people.

Q. What was your position with Ramo-Wooldridge? A. Staff engineer on electrical facilities.

Q. And what were your particular duties? A. Well, again design of the electrical facilities on the new construction, as well as maintenance and rehabilitation of existing, for laboratories purposes. We purchased our power at 16 kv from the Edison Company and from there on out we

handled the transformation and switching.

Q. What was your employment after that? A. City of Colton, California.

Q. When did you go with them? A February of '58.

Q. And in your position with the City of Colton, what have been your duties? A. Design, construction of the distribution facilities, maintenance and operation.

Q. Does the City operate electric generating facilities? A. No.

Q. To what extent, if at all, have you qualified as a state engineer? A. I am a registered electrical engineer, State of California.

Q. How long have you been registered as an electrical engineer in California? A. Six or seven years. No, it is longer than that, it must be about ten years.

Q. Thank you.

Where does the City of Colton get its electric generating requirements? A. Well, they purchase their energy from Edison Company.

Mr. Cragun: I would like marked for identification a paper entitled "Agreement" dated October 1, 1945, between the

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City of Colton and Southern California Edison Company, Limited.

Presiding Examiner: That will be marked Exhibit No. 5 for identification.

(The Document Referred to Was Marked Exhibit No. 5 for Identification.)

By Mr. Cragun:

Q. Mr. Sack, I hand you Exhibit No. 5 for identification and ask you if you can tell me what that is? A. It appears to be a copy of our 1945 contract with Edison Company.

Q. A copy, you say? A. A copy of it.

Mr. Cragun: Mr. Examiner, I understand that Edison has had an opportunity to compare this and is willing to stipulate to its accuracy.

Mr. Bury: Yes. The Edison Company was previously furnished with copies of what has now been identified as Exhibit 5 and we will stipulate it is a true and correct copy of the written agreement entered into the first day of October, 1945, between the City of Colton and Southern California Edison Company.

Presiding Examiner: Thank you, Mr. Bury.

Mr. Cragun: I offer Exhibit No. 5 for identification in evidence as the contract in issue in this proceeding.

Presiding Examiner: There being no objection, it will be

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admitted.

(The Document Heretofore Marked Exhibit No. 5 for Identification was Received in Evidence.)

By Mr. Cragun:

Q. Mr. Sack, what do you do with the energy which you purchase from Edison? A. We distribute it to our customers, resell.

Q. You resell it to your customers, did I understand you to say? A. That is right.

Q. Would you keep your voice up, please? I have a little trouble hearing you.

Now, are all of the electric facilities of the City of Colton located within the city? A. No.

Q. To what extent are there facilities outside the city limits? A. There is some small distribution to customers and we have some wells outside of the city limits.

Q. Do you have any information as to whether that is a matter of contract between the City and Edison? A. I don't understand your question.

Q. Very well. I will withdraw it. A. You mean regarding the areas?

Q. Yes. I was asking of the extent to which there are

facilities outside of the city limits and you said there were some small areas. I would like to identify them, taking as little room in the record as necessary. I notice that in the contract—— A. The areas are identified in the contract.

Q. And are those the facilities to which you referred in saying there were some small areas. A. That is right.

Q. Does Southern California Edison Company have any facilities within the city limits of Colton? A. They do.

Q. What are those facilities? A. They serve some of the larger industrial customers.

Q. They actually have customers within the city limits, then? A. They do.

Q. Who are some of those customers? A. Griffin Wheel, Crane-Pacific, Weyerhauser, Alliance Ware,——

Q. Do you know at what voltages it serves those customers? A. —and some small residential customers.

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Q. I am sorry. Have you now completed your answer to my previous question? A. I have.

Q. Do you know what voltages or the voltages at which this

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serves those customers? A. Well, it is my understanding that Griffin Wheel is served at 66 kv and other than the residential customers the balance are served at 12 kv.

Q. Do they own any properties within the city limits? A. I believe a portion of their Colton substation is in the city limits, if not all of it. I am not definite on the city line.

Q. What connections do they make to the City of Colton substation? A. Two 12 kv lines.

Q. Do they own the step-down transformers? A. They do.

Q. Will you describe what, if any, additional places Southern California Edison delivers or meters energy to the City of Colton at the City of Colton substation? A. At four well sites.

Q. Are those well sites within the City? A. Yes and no. Two well sites are within the city and the other two are not.

Mr. Cragun: Mr. Examiner, I would like marked for identification an exhibit entitled "Compilation by months and years for 1954 through October, 1959," showing billing periods, purchases, actual charges, amounts chargeable under the October 1, 1945, contract, and excessive charges imposed by

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Edison upon Colton; for identification.

Presiding Examiner: It will be marked Exhibit 6 for identification.

(The Document Above Referred to Was Marked Exhibit No. 6 for Identification.)

By Mr. Cragun:

Q. Mr. Sack, I hand you Exhibit 6 for identification and ask you if you can tell me whether that was prepared under your supervision? A. Yes.

Q. Are the records from which that was prepared matters under your supervision and control in your position as electrical supervisor? A. Right.

Q. From those matters have you been enabled to determine the number of kilowatt hours which, since 1954, and to the date shown on the exhibit, November 2, 1959, have been furnished by Edison to Colton? A. Will you repeat that question, please?

Q. Let me withdraw that question and I will ask you to turn to the first page beneath the cover which is marked "Page 2" and explain what you have compiled in the column marked "Kilowatt hours." A. We compiled the total kilowatt hours that we purchased during 1954.

Q. And how is that compiled, by months, as shown? A. Right, by months.

Q. What does the next column, entitled "Charged by Edison," reflect. A. "Charged by Edison" was their billing as per the contract up to 9-1—up to that point it was as per the contract.

Mr. Roos: What point was that?

The Witness: In September.

By Mr. Cragun:

Q. And after that, what does it reflect? A. It reflects the difference in cost of our energy that we purchased, under the next column.

Q. May I call your attention to the fact that I am only directing questions to Column 3 entitled "Charged by

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Edison." A. Under that column, those are the actual billings by Edison.

Q. Were all of the buildings at the contract rate?

Mr. Roos: I object to that, Mr. Examiner, as calling for a legal conclusion of this witness, as to whether the charges were at the contract rate. I believe that involves interpretation of the contract and any possible amendments or revisions thereto.

Mr. Cragun: Mr. Examiner, all I mean to have the witness say is whether the rate applied was the rate set forth in

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Exhibit No. 5.

Mr. Bury: If it is so qualified, we have no objection.

Presiding Examiner: I didn't understand, Mr. Bury.

Mr. Bury: Mr. Roos has objected to the statement "charges per '45 contract" making the witness interpret the contract, and of course the interpretation of that contract is an issue in this proceeding. If he means in that column that this represents the results he comes out with in applying the rates which appear in Exhibit 5, then we have no objection.

Mr. Roos: If that is the understanding of the witness, to the question as asked, I have no objection to him answering it. But I do object to the question in the form in which it was asked.

Presiding Examiner: Rephrase your question, Mr. Cragun, and get it clear to all parties.

Mr. Cragun: All right.

By Mr. Cragun:

Q. Mr. Sack, to what extent are the charges made by Edison which you show in your Column No. 3 the result of the application of the rates set forth in Exhibit 5, the 1945 contract? A. The figures in Column 3 are the figures billed by Edison Company to the City of Colton.

Q. But, to what extent are they the figures arrived at by applying the rates shown in the 1945 contract?

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A. They are higher.

Q. All of them? A. Yes. Well, no, not those up to September.

Q. In other words, up to September, as you have set forth here "Charged by Edison," those rates are the rates which you would come to computing them under the 1945 contract, Exhibit 5? A. That is right.

Mr. Bury: Again I will have to object to the phrase "under the 1945 contract." If he means the rates set forth in Exhibit 5, the additional rates or how else he wants to denominate——

Mr. Cragun: That is all the question called for, as I understand it, Your Honor.

Presiding Examiner: That is what I understand the question to call for. The objection is overruled.

The Witness: Now let me have the question again.

Presiding Examiner: Will you read the question, Mr. Reporter.

(Question and answer read.)

Presiding Examiner: We will take the afternoon recess.

(Whereupon, at 3:30 p.m., the hearing was recessed until 3:40 p.m.)

Presiding Examiner: Are you ready, Mr. Cragun?

Mr. Cragun: Yes, sir. Shall I proceed?

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Presiding Examiner: Yes, sir.

By Mr. Cragun:

Q. Mr. Sack, to what extent, if at all, were the total kilowatt hours purchased for each of the years from 1954, to November 2, 1959, billed to Colton at the rates set

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forth in the 1945 contract, Exhibit 5? A. Well, they weren't according to the original contract.

Q. Now, does your—that is not true, is it, as to the first nine months which you have referred to? A. The first nine months were according to the original contract.

Q. Now, what about the balance of the period shown in your Exhibit No. 6? A. They were billed according to other rates.

Q. Were those rates greater or less? A. Greater.

Q. Have you set the differences between those later rates and the rates set forth in the 1945 contract out in this Exhibit 6? A. Yes, I believe the difference is shown in the last column.

Q. How did you compute the charges per 1945 contract, the column headed "Charges per 1945 contract"? A. The charges per 1945 contract are approximations. Because of the lack of metering it is impossible to determine

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demand and power factor discounts.

Q. Now, as a result of those approximations is the difference in your final column, headed "Excessive charges," greater or less than might be the case if you had had metering which would permit of more exact calculation? A. I held my approximations on the conservative side so as to not show an excessive difference if there were any other method of determining the values, but I could not use the exact values, so I had to estimate.

Q. In other words, this difference is a minimum? A. Right. I feel it is.

Q. Now, Mr. Sack, to what extent, if at all, has the City of Colton protested the rates which it is paying for energy purchased from Edison? A. They have protested from the November billing, which would show a

December check, through to the present time, with a protest stamped on the check.

Mr. Cragun: That concludes my direct examination.

Presiding Examiner: November of what year?

The Witness: 1957.

Presiding Examiner: So that you paid beginning with September 1 of '54 down to '57 without protest?

The Witness: That is right, that is as far as my knowledge goes.

Presiding Examiner: Is the energy delivered by Edison to

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the City of Colton for the two wells in the city and the two wells outside the city, is that energy used for city use and not for resale? A. No. That energy is billed into the Electric Department. We in turn bill the Water Department. We purchase it as one unit.

Q. You buy it and sell it to the Water Department, is that right? A. That is right.

Presiding Examiner: Mr. Bury?

Mr. Bury: Mr. Everett, do you have any questions you might like to ask first?

Mr. Everett: The Staff just has one question for clarification.

Presiding Examiner: Excuse me, Mr. Everett. Go right ahead.

Mr. Everett: Thank you.

Cross-Examination

By Mr. Everett:

Q. In regard, Mr. Sack, to Exhibit No. 6, on page 2 of that exhibit, the first column entitled "Period" and the second column entitled "Kilowatt hours," the Staff

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simply wishes to know what the significance of the first figure in the second column, namely 1,664,640 kilowatt hours, what is the relation between that figure and the period shown in the first column

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on the same line, that period being December 31, 1953, to February 1, 1954? A. That was apparently the date of the Edison bill. These figures were taken from Edison billings.

Q. Those were the aggregate number of hours billed by the company to the City for the period shown in the first column? A. Right.

Presiding Examiner: Mr. Everett, that would be for the month of January, wouldn't it, 1954?

The Witness: Well, it picks up one day of December and one day of February.

Presiding Examiner: I see.

By Mr. Everett:

Q. This figure, Mr. Sack, under the kilowatt hour—in the kilowatt hour column, does that represent the difference in the meter readings as shown on December 31, 1953, and February 1, 1954? A. Yes, that is right.

Q. That is the difference in metering? A. Right.

Q. Mr. Sack, on page 4 of this Exhibit No. 6, the total which you show of the second column, for the kilowatt hours, is 23,163,540? A. Right.

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Q. That figure appears to be different than that shown in Form No. 1 filed with the Commission by the City of Colton. A. That was one of the reasons I went directly to the Edison billing. This total, while I recognize there is a discrepancy there between some of the other figures around, these are taken directly from their billing.

Q. Then you—— A. With adjustments.

Q. You believe, then, that this figure which you have shown here in the exhibit, the figure which I mentioned, 23,163,540 should be taken as the figure for the year 1956 rather than the figure which was shown in the Form 1 which was filed with the Commission? A. That particular column there was the best I could do to make it come out with the dollars value as billed on the Edison bills. That would be the best way of putting that.

Q. I should have mentioned, Mr. Sack, that this City of Colton Form 1, 1956, figure to which I am referring appeared in the Exhibit No. 4 which was introduced in evidence by the Staff. A. Yes. I don't have a copy of that.

Mr. Goldberg: I will give it to the witness. What is your question in that connection? You have drawn his attention to the figure reported by the City in FPC Form No. 1 for '56 and compared it to the figure shown in Exhibit 6.

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Mr. Everett: Yes, Mr. Goldberg, that is correct.

As Mr. Sack will see, there is a variation in the kilowatt hour figures for 1956 as shown on the Exhibit No. 4 and on page 4 of Exhibit No. 6.

The Witness: I can't explain the difference because of having nothing to do with the preparation of that Form 1 report. I can explain some discrepancies there, though.

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By Mr. Everett:

Q. Mr. Sack, you referred to the Edison billings. Do they show just the dollars, or do they show the dollars and kilowatt hours, both? A. They show meter readings, kilowatt hours, multipliers, and dollars. In some cases they don't reconcile.

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Q. Would you explain, Mr. Sack, what you mean when you say that they don't reconcile? A. I will have to show you the billings. I have them here in my briefcase. May I get them?

Presiding Examiner: Yes.

Mr. Everett: We would appreciate your doing so.

By Mr. Everett:

Q. Would you explain now what you mean when you say something didn't reconcile? A. Well, we have a billing here on the account No. 6940905. The difference in readings, meter readings, was 1946. The multiplier was 80. The bill shows 55,680 kilowatts, but yet if you check it back, we find the amount is correct if we use 155,680 kilowatts, and that was the figure that was used in compiling these, the adjusted figure in that particular month. We have a total of six of those happening in 1956, which perhaps explains why the Form 1—I mean why it was in error.

Mr. Everett: Thank you, Mr. Sack.

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We have no further questions.

Presiding Examiner: Mr. Roos?

Cross-Examination

By Mr. Roos:

Q. Mr. Sack, would you refer to Exhibit No. 5, for identification, please? I note on the last page, second to last paragraph, the contract provides that it shall be filed with the Railroad Commission. Is it true that the Railroad Commission, as referred to in the contract, is now renamed the California Public Utilities Commission? Are you aware of that? A. I was aware of that, yes.

Q. Do you know whether this contract was filed with the California Public Utilities Commission, as provided in the contract? A. I don't personally know, no.

Q. Do you have any reason to believe that it was not filed——

Mr. Goldberg: I object to that. The witness isn't required to speculate. He said he doesn't know. It isn't even relevant, in any event.

Presiding Examiner: Mr. Roos, this witness wasn't working for the City of Colton at the time the agreement was made, so he may not have knowledge of whether it was filed or not.

Mr. Roos: I understand.

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By Mr. Roos:

Q. Now, would you refer to Exhibit No. 6, Mr. Sack? Referring to the fourth column from the left on page two, you have entitled that "Charges Per 1945 Contract". Would it be more accurate to state that this column of figures is the column of figures calculated upon the commencing rates as provided in this 1945 contract?

Mr. Goldberg: Well, Mr. Examiner, I think I will have to object to that beeause it purports to describe the rates set forth in Exhibit No. 5 as commencing rates, whatever that might mean. I don't think I would object to the question if that characterization were dropped and he were asked whether the heading of the column could be "Dollars or Billing per rates set forth in Exhibit 5".

By Mr. Roos:

Q. Well, in any event, Mr. Sack, this column of figures refers to a calculation based upon the rates as set forth in page two of Exhibit No. 5, is that correct? A. That is correct.

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Q. Now, you stated that Edison delivers certain amounts of electrical energy to the City of Colton outside the city limits of the City of Colton; is that correct? A. That is right, there is two locations.

Q. Do you know if those are the—those are the well pumping sites?

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A. Two well pumping sites, plus the energy to the domestic consumers outside of the city limits.

Q. That is Edison's own domestic consumers, you mean? A. Right.

Q. Is the energy that is delivered to the pumping sites, do you know whether that is separately metered? A. It is.

Q. And you testified in your direct examination that this energy delivered at the pumping site was re-sold to the water department. I take it that water department to which you refer is a—— A. City of Colton Water Department.

Q. That is a part of the corporation, the municipal corporation, City of Colton, is it not? A. Well, its accounting is separate, and it is set up under the uniform accounts as an operation of its own.

Q. In any event, it is a part of the municipal government of the City of Colton, is it not? A. A division of it, yes.

Q. Now, you testified that you protested the rates charged you by Edison commencing with the November, 1957 billing. To whom did you protest those rates? A. The protest was stamped on the checks.

Q. Did you file any protest with the California Public Utilities Commission?

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A. We were in a joint action at the time the rates were filed, and we protested the findings but they didn't do any good.

Q. I am referring now to the billing since the November, 1957 billing. I understood your answer to be that you protested it on the face of the check? A. That is right.

Q. That check was in payment of the bills? A. "Paid in protest" was stamped on the check, on the other side.

Q. Did you make any protest to the California Public Utilities Commission of these billings? A. Not to my knowledge.

Q. Do you know whether the City of Colton appeared in any hearings before the California Public Utilities Commission at which this 1945 contract was a subject in issue before the California Commission?

Mr. Goldberg: We object to that, Mr. Examiner. It has no materiality or relevance to any of the issues in this case.

Mr. Roos: Well, I think it does have a materiality, Mr. Examiner. As mentioned by Mr. Bury in his opening argument, the City of Colton has had numerous opportunities before to raise this issue, and has appeared before the California Public Utilities Commission on two separate hearings, in which these rates, as provided for in this 1945 contract, were in

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issue, and has never raised the point they are seeking to raise at this time before the Federal Power Commission.

Mr. Goldberg: Mr. Examiner, to begin with, there is no logical conclusion that can be drawn from it that coun-

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sel purports to draw. The fact that the issue may not have been raised with the California Commission does not mean that the issue was not there. But whether there or not, and whether raised or not is beside the point. This very same contention was advanced in some of the cases that I referred to this morning, particularly the Wisconsin cases. I am referring to State of Wisconsin versus the Federal Power Commission, decided by the District of Columbia Circuit, 201 Federal 2nd 183, in which the Court held that a history of previously unchallenged regulation by the State does not oust the Federal Power Commission of jurisdiction. That is squarely on the point.

I don't think we should clutter up the record with what happened before the California Commission. All we are concerned with here is: Do the facts establish Federal Power Commission jurisdiction? And if they do, neither we nor Southern California Edison nor the State Commission can deprive the Federal Power Commission of jurisdiction by any of their actions prior to this proceeding.

Presiding Examiner: The objection to the question is sustained.

Mr. Bury: Your Honor, I had wished an opportunity to be

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heard on that.

Mr. Roos: I have no further questions of the witness.

Presiding Examiner: Mr. Bury.

By Mr. Bury:

Q. Mr. Sack, let's turn first to Exhibit 6. I indicate preliminarily I am just trying to get a little more explanation.

Presiding Examiner: Off the record.

(Discussion off the record.)

Presiding Examiner: On the record.

By Mr. Bury:

Q. Mr. Sack, turning first to page three of Exhibit 6 and starting with the line in the first column marked 8-1 to 9-1, the figure in the second column, kilowatt hours, appears to be 2,039,430. Where did you obtain that figure? A. From your billing.

Q. Do you have copies of those billings here? A. Yes.

Q. How many billings were there? Put it this way; Is that the aggregate of several billings? A. I don't know without looking.

Q. Would you, please? A. I will have to get the file. Yes, I believe it was.

Q. Can you break that down as to account?

A. No, I can't. There is a slight difference here of 9,000 kilowatts between this total here. In some cases I didn't have complete copies of all of these and it was necessary to go back to the City's file, and there they are filed by voucher, where I didn't have complete copies, and I couldn't bring those voucher copies with me.

Q. Well, is it correct—— A. But between the total I have here and what is typed here there is only 7,000 kilowatts difference. I have 2,047,880 as the total, and it is printed as 2,039,430.

Q. Do you happen to have any other billing periods before where you might not have that conflict? We are merely trying to go through and explain how it was done. If you find one without a discrepancy, it might be clearer. A. Without a discrepancy?

Q. Yes. A. Take your pick. I have them all.

Q. Take the period from November 1 to December 1, 1955, which appears on page 3 of Exhibit 6. The figure

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there in the second column is 1,768,350 kilowatt hours. Show us how you derived that figure? A. I would suggest we go to a little later year, if you want to get a little better accuracy for a demonstration.

Q. Do you have before you the billing for that period, 11-1 to 12-1-1955?

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A. Yes, but I don't have the breakdown with me.

Q. You mean you don't have the bills? A. No, just the resale billing.

Q. Let me ask you this: Are the figures appearing in that second column intended to be the aggregate kilowatt hours delivered by Edison to the City of Colton at all delivery points for that period? A. That is what they are intended to be, yes.

Q. And for that period of November 1 to December 1, 1955, how many kilowatt hours have you got for the delivery to City of Colton substation? A. City of Colton substation? I have 1,545,600.

Q. And is the difference between that figure you have just given for deliveries at City of Colton substation and the figure appearing in the second column of page three the total kilowatt hours consumption at the four pumping accounts? A. I believe so, yes.

Q. And that generally was the method followed in arriving at the figures which appear in the second column of each page, to aggregate the total kilowatt hours delivered at each delivery point of Edison to the City of Colton, both City of Colton substation and the pumping accounts? A. Right.

Q. Again turning to page three of Exhibit 6, the second column, for November 1 to December 1, 1955, do you know for

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that month the number of kilowatt hours delivered to the Walnut Street pumping plant? A. I do not.

Q. Do you know the number of kilowatt hours delivered to the Hot-Well Pumping plant? A. I don't know the number of kilowatt hours delivered to any of the pumping plants that I have records with me on.

Mr. Goldberg: Mr. Bury, you have been asking the witness about original records, haven't you, that he may have brought with him?

Mr. Bury: No, sir. I asked him if he could tell me the number of kilowatt hours delivered for certain periods at certain locations.

Mr. Goldberg: It doesn't have to be from original records?

Mr. Bury: No.

Mr. Goldberg: You are referring to the information we supplied to you?

Mr. Bury: That is right. For the Examiner's information, we received by mail an additional exhibit, which has not been offered, which contains some of this detail, which I am seeking to develop through the witness.

Mr. Goldberg: We don't propose to offer it.

Mr. Bury: That is right, I appreciate that.

Mr. Goldberg: And you probably understand why. I think you know our position. That was prepared at the request of

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the staff. Now, we have that information, and if Mr. Bury has no objections to answers to his question from that data, that is all right.

I am just trying to be helpful.

Mr. Bury: I appreciate that. And I think certainly for the purpose of developing method on this line of ques-

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tions he can show us—he can tell us the numbers or the values that he used without going back to original records.

Mr. Goldberg: I was afraid he thought you were asking him about original records, and we were aware of this.

The Witness: That is what I thought he wanted, from the original records.

Mr. Goldberg: Yes. Now, would you restate your question to him now?

Mr. Bury: All right. I think we can come to it. Let's illustrate this real briefly again.

By Mr. Bury:

Q. Page three of Exhibit 6, period November 1 to December 1, second column, kilowatt hours, 1,768,350. I believe you read into the record the portion of those kilowatt hours delivered at city of Colton substation. Would you repeat that value, please? A. November 1st to December 1st of '55, I have 1,635,200.

Q. And for that same period, what are the number of kilowatt hours delivered by Edison to the City of Colton at Walnut Street pumping plant?

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A. Four thousand, on this copy here.

Mr. Goldberg: What does your copy show——

Mr. Bury: Are we collecting for the period——

The Witness: I am sorry. 1,040.

Mr. Bury: No.

By Mr. Bury:

Q. For the period November 1 to December 1. A. November 1, 6880.

Q. And at the Hot Well pumping plant? A. 2,870.

Q. And for the Domecq plant? A. 24,360.

Q. And the kilowatt hours delivered at the Hi-Line or Rialto plant? A. 65,840.

Q. And at the Citrus pumping plant? A. 33,200.

Q. And am I correct that the total kilowatt hours delivered at those five pumping plants for that period total 133,150 kilowatt hours? A. Right.

Q. And that added to the value of 1,635,200 kilowatt hours delivered at the City of Colton substation, total of the figures shown in the second column on page three of your exhibit for the period November 1st through December 1st, 1955?

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A. Right.

Q. And that is generally the manner in which the kilowatt hours stated in the second column of each page of Exhibit 6 were developed? A. Right.

Q. By aggregating total kilowatt hours delivery at all delivery points? A. Right.

Q. The third column, entitled "Charged By Edison"—this applies to all pages of the exhibit—that column contains the amounts charged by Edison for electric service to Colton for that period, for the period shown in the first column? A. That is right.

Q. And, as in the case of the second column, did you aggregate the dollar amounts billed for each of the delivery points, as was done with the kilowatt hours in the second column? A. We did.

Mr. Bury: Excuse me. I skipped a preliminary question.

By Mr. Bury:

Q. You do receive a separate delivery bill for each one of those delivery points from Edison? A. We do.

Q. Now, going back again to page three, the line November

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1-December 1, 1955, and now to the fourth column, there appears there the figure of $14,568.69. How did you arrive at that figure? A. Well, I used the total billing under Schedule R of $13,952.35. Now, then, computing the consumption as per Exhibit No. 5, I used past history in other years to determine my estimated power factor and demand charges. So I used—I billed it as if it were conjunctive billing prior to September, of '54, computed it the same as it had been prior to September of 1954, and used those same figures or estimates and adjustments for the time of the year.

Q. Well, Mr. Sack, you said you have used past history and you made some estimates. Would you show us just specifically how you derived that figure in the fourth column? In other words, what numbers you used and explicitly what method you used to develop that figure? Maybe we can follow it. A. Well, we have a demand shown under the "R" rate of 4,384 kilowatts.

Q. Would you repeat that? A. 4,384 kilowatts. Then, referring back to the other years prior, I took an average, a weighted average, and added it to that to obtain a total of demand of 4,547 kilowatts. That was my demand.

Q. You say you used a weighted average demand and related

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that to the kilowatt demand for billing under Schedule "R". Preliminarily, when you refer to Schedule "R", this figure, are you referring to a rate schedule that was being used by Edison for computing the charges which appear in the third column at that time? A. No. I refer to the schedule on Exhibit 5.

Q. I think we are having trouble with our terminology. I gather from that that when you say that the kilowatt

demand for the "R" account or "R" deliveries, I take it you mean resales—— A. No, I took the kilowatt demand you show on your "R" billing, which would be the resale account. I don't know that account number. Yes, I do, too—685-1205.

Q. That is the deliveries to the—— A. That is the deliveries to the Colton substation.

Q. City of Colton substation? A. That is right, City of Colton substation.

Q. So that this figure of 4384 kilowatts that you started with was the billing demand appearing on the bill that Edison presented to you for that period for deliveries to City of Colton substation? A. That is right.

Q. And you say you applied some factor to that based on a weighted average? A. That is right.

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Q. To increase that to 4547? A. I increased that to 4547.

Q. Well, what was the factor that you applied? A. 163 kilowatts demand.

Q. Do I gather from that that you added 163 kilowatts to the billing demand for the delivery to the City of Colton substation? A. That is right.

Q. To come up with 4547 kilowatts used for your reconstructed billing in column four? A. That is right.

Q. And how did you arrive at the figure of 163 kilowatts which you added? A. By going back through the billing, where you once, prior to September of '54, you have a fairly complete record through the several years there showing demands and power factor discounts for these various other metering points.

Q. What period of time did you use for developing this factor, when you said several years? A. Probably a year and a half. I can't remember exactly, two years,

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something in that order. There wasn't a whole lot of variation from one year to the other for the same month.

Q. This factor of 163 kilowatts, looking at page three, did you use that value of 163 kilowatts as an additive for

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each month in reconstructing that billing? A. No, it varies from month to month, the same as it varied under actual practice when we were billed on that basis.

Q. I have been trying to avoid going to any more detail if I can find some way around it. Could you briefly describe the formula or the criterion that you used in arriving at this factor that you added to each of these bills in reconstructing it? A. There was no set formula.

Q. Did you estimate it for each month? A. That is right, the estimates were guided by the previous history.

Q. Is it correct to say, then, that you looked at the relationships between the demands at the various delivery points for some past period, and from that estimated some figure which you added to the known value, kilowatt billing demand at City of Colton substation, for the purpose of coming up with a billing demand to use in applying the charges which appear on pages two and three of Exhibit 5? A. I didn't use any mythical figure, I used the figure off your billings—from previous years. For instance, your Walnut Street shows a billing of 16 kilowatts demand for February, '54, and Domecq shows 69.6, Walnut Street shows 52, Citrus shows 90, and I based it on those figures on your billings from previous years.

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Q. Did you go back and try to find what you thought was a representative month? A. That is right, a representative month based on your previous years' billings.

Q. Do you have with you the work sheets you used in developing each of these figures? A. No. I only have the total figure with me that I used.

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Q. Do you have the work sheets somewhere here in Washington? A. No.

Mr. Bury: Mr. Examiner, I would like to consider for a little while whether or not it will be necessary for us to have those work papers produced. Perhaps while we consider it, this might be an appropriate time to adjourn.

Presiding Examiner: All right. We will take the afternoon recess.

Mr. Goldberg: Are we meeting here tomorrow?

Presiding Examiner: This Court will be in recess until 10 o'clock tomorrow morning, at which time we will reconvene in this room.

(Whereupon, at 4:28 p.m., a recess was taken to reconvene at 10 a.m., Wednesday, December 9, 1959.)

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WEDNESDAY, DECEMBER 9, 1959.

The above-entitled matter came on for hearing, pursuant to adjournment, at 10:00 a.m.

BEFORE:

HARRY W. FRAZEE, Presiding Examiner.

APPEARANCES:

(As heretofore noted.)

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PROCEEDINGS

Presiding Examiner: The hearing will come to order, please.

Are there any preliminary matters this morning?

Mr. Cragun: Mr. Examiner, I have one preliminary matter. I wish to apologize for myself and the witness getting here no earlier than we did. We ran into a little

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difficulty in coordination getting out of my office and couldn't find one another, and that held us up just the extra time we might have used.

Presiding Examiner: That is all right, Mr. Cragun.

Are there any other preliminary matters?

If not, are you ready, Mr. Bury?

Mr. Bury: Yes, Mr. Examiner. We thank you, first, for the opportunity to adjourn a little earlier yesterday. I think it would save some time for everybody on account of that.

On further consideration, we have just one more question of Mr. Sack.

FREDERICK A. SACK

resumed the stand as a witness, having been previously duly sworn, and testified further as follows:

Cross-Examination (resumed)

By Mr. Bury:

Q. Mr. Sack, do you have Exhibit 6 before you? A. No, I don't.

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Mr. Goldberg: Here you are.

The Witness: Thank you.

By Mr. Bury:

Q. Turning to page three, we were discussing yesterday the first four columns, and turning now to the last column on page three, and also with respect to the last column on each of the pages of this exhibit which you have captioned "Excessive Charges", that column represents, does it not, the arithmetical difference between the third and fourth columns? A. That is right.

Mr. Bury: That is all the questions we have of Mr. Sack.

Presiding Examiner: Mr. Cragun?

Mr. Cragun: Is it in order to undertake redirect at this point, or does the staff have questions?

Mr. Everett: Mr. Examiner, the staff has no questions at this time.

Presiding Examiner: California Commission?

Mr. Roos: California Commission has no questions, Mr. Examiner.

Redirect Examination

By Mr. Cragun:

Q. Mr. Sack, on cross-examination reference was made to the submission of separate bills by Edison to Colton for each metering point since September, 1954. Now, prior to September, 1954, were there separate metering points?

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A. There were.

Q. Was the electric energy delivered metered at the several metering points prior to September, 1954? A. It was.

Q. Was a single bill submitted by Edison for the energy delivered by Colton at the several metering points up to September, 1954? A. There was.

Mr. Roos: I didn't hear the answer, Mr. Examiner.

The Witness: There was.

By Mr. Cragun:

Q. Some point also was made on cross-examination of the variation in kilowatt hours between what you reported to the Federal Power Commission and what is shown on your Exhibit 6, for identification. Now, does either of those sources, your report or the exhibit, show the number of kilowatt hours for which you actually paid Edison? A. Exhibit 6 was made up from the Edison billings.

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Q. What is the answer to my question? Does either show the number of kilowatt hours for which you pay? A. The Exhibit 6 shows the number of kilowatt hours for which we paid.

Q. In connection with the difficulties which you described in answer to Mr. Bury's questions as to how you computed the information shown on Exhibit 6 for identification,

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to what extent would those difficulties have been raised, had Edison continued to send you invoices calculated as set forth on page two of the 1945 contract? A. Prior to September of '54, the demand charges and the power factor discounts were listed—were shown on their invoice of billing, for the pumping metering; as a matter of fact, for all metering.

Q. So that there would have been no difficulty in figuring the power factor credit and the demand charge with respect to pumping, had the previous system of billing continued; is that correct? A. That is correct.

Q. To your knowledge, has there always been a single contract between Edison and Colton covering the purchase of all of its electric requirements? A. To my knowledge, yes.

Q. Mr. Sack, at what voltages are deliveries made to the City's Colton substation? A. Delivered to the substation at 12 kv, transformed to 4 kv, at which point we take delivery.

Q. Do I understand that some change is anticipated in that delivery voltage? A. Yes. We have constructed a new substation and expect to take delivery at 12 kv, and the metering will be done at 12 kv. We have also provided additional space for future

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delivery at 66 kv. This future space was as requested by Edison.

Mr. Cragun: That concludes the redirect, Mr. Examiner.

Presiding Examiner: Thank you, sir.

Mr. Cragun: At this point, Mr. Examiner, the City of Colton offers in evidence the exhibit marked 6, for identification.

Presiding Examiner: Hearing no objection, Exhibit 6 will be admitted.

(The document heretofore marked Exhibit No. 6 for identification was received in evidence.)

Presiding Examiner: You may be excused, Mr. Sack——

Mr. Bury: Excuse me. I had just two very short questions in response to the redirect, if I might.

Presiding Examiner: I thought you indicated you didn't have any.

Mr. Bury: I am sorry.

Recross-Examination

By Mr. Bury:

Q. Mr. Sack, you just testified concerning some anticipated changes in the manner of furnishing electric service to the City of Colton, apparently in the reasonably near future a change to a 12 kv delivery and a request to provide space for an eventual 66 kv delivery. Those are, of course, just anticipated events? They are not things which have yet

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occurred? A. Well, your equipment is all installed. We are ready to go in between 30 and 60 days on the 12 kv metering.

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Q. It does not represent conditions which existed at any time prior to the filing of the petition, or even the commencement of this hearing; is that correct? A. That is correct.

Q. You made, also, reference to the presentation of separate bills.

Mr. Bury: Excuse me for a second, Mr. Examiner. I am trying to locate something.

I am handing to the witness a reproduction of what appears to be a City Warrant of the City of Colton of the stubs of five bills of the Southern California Edison Company, presented to the City of Colton, and ask that that be identified as an exhibit at this time.

Presiding Examiner: That will be marked Exhibit No. 7 for identification.

(The document above referred to was marked Exhibit No. 7 for identification.)

By Mr. Bury:

Q. Mr. Sack, does this Exhibit 7 for identification show at least the type of bill stub presented to the City of Colton for its electric accounts by Southern California Edison and the check used in payment therefor by the City of Colton?

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A. It seems to. I don't have the direct handling of these checks, but as far as I can tell, that is correct.

Q. You mentioned—perhaps this goes a little bit back behind the redirect, but to try to tie this together—you mentioned yesterday in connection with payment under protest that the checks the City used to pay its electric bill and the stubs of those bills were stamped "Paid under protest". Is the type of stamp appearing on the

check and bill stubs on Exhibit 7 the type of stamp to which you referred? A. That is right.

Mr. Bury: I would like to offer Exhibit 7 in evidence.

Mr. Goldberg: Mr. Bury, just so we know why you are offering it, you are offering it for the purpose of showing what the witness meant when he said "Paid under protest"?

Mr. Bury: That is one of the purposes. And he has also mentioned that Edison Company presented to the City separate bills, and this picture represents at least the stubs from the various bills presented to the City.

Mr. Goldberg: I don't think there is any issue between us that that is what you did since September, 1954.

Mr. Bury: No, I believe there is not, and he has testified to a stamp of this type appearing on the bill stubs and checks since November of 1957. This Exhibit 7 happens to be the most recent bills and payments we have, because we took it at the time we still had the check in the building before it

was processed for payment.

Mr. Goldberg: We have no objection for the purposes stated.

Mr. Bury: Fine.

Presiding Examiner: Exhibit 7 will be admitted in evidence at this time.

(The document heretofore marked Exhibit No. 7 for identification was received in evidence.)

Mr. Bury: That is all that we have.

Presiding Examiner: Mr. Everett?

Mr. Everett: The staff has no questions, Mr. Examiner.

Mr. Roos: California Commission has no questions.

Mr. Cragun: No further questions.

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You may step down, Mr. Sack.

Presiding Examiner: You are excused.

(Witness excused.)

Mr. Goldberg: Mr. Examiner, at this time we would like to incorporate by reference to the Commission's files certain materials, and we have had prepared a list of the material. I will read them into the record, but it may be convenient for everybody to have that before them.

We wish to incorporate by reference to the Commission's files certain pages from Southern California Edison Company's F.P.C. Form No. 1, for the year ending December 31, 1958, pages 23, 39A, 39B, 69A, 76, 78, 79A, 84, and a map contained

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at last page of report, bearing number 9117 and entitled "Southern California Edison Co., Map of Transmission System."

Now, Mr. Examiner, would it be more appropriate to give an individual item designation for each page, or shall we use one for the entire—for all of the pages, or portions of the report for that year?

Presiding Examiner: Let's mark the data which you have just identified as item "C", for identification.

Mr. Goldberg: All right.

(The material above referred to was identified as Item "C" by reference.)

Mr. Goldberg: Now, as Item "D" for identification, we offer from the Annual Report of Southern California Edison Company, F.P.C. Form No. 1, for the year ending December 31, 1957, pages 25, 43A, 43B, 75, 82, 84, 85A and 90.

Presiding Examiner: That will be marked Item "D" for identification.

(The material above referred to was identified as Item "D" by reference.)

Mr. Goldberg: As Item "E", we offer from F.P.C. Form No. 1 of Southern California Edison Company for the year ending December 31, 1956, pages 25, 55, 75A, 82, 84, 85A, 90, and a map following page 110, bearing number 9117 and entitled "Southern California Edison Company, Map of Transmission System."

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Presiding Examiner: That will be marked Item "E" for identification.

(The material above referred to was identified as Item "E" by reference.)

Mr. Goldberg: As Item "F" for identification we offer the following from F.P.C. Form No. 1 of Southern California Edison Company for the year ending December 31, 1955, pages 25, 43, 44, 75A, 82, 84, 85A, 90, and a map contained at the last page of the report, bearing number 9117 and entitled "Southern California Edison Company, Map of Transmission System."

Presiding Examiner: The data will be marked Item "F" for identification.

(The material above referred to was identified as Item "F" for identification by reference.)

Mr. Goldberg: As Item "G" for identification, we offer, by reference to F.P.C. Form No. 1 of Southern California Edison for the year ending December 31, 1954, pages 25, 55A, 75A, 82, 84, 85A, 90, and a map contained at the last page of the report, bearing number 9117 and entitled "Southern California Edison Company, Map of Transmission System."

Presiding Examiner: The data will be marked Item "G" for identification.

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(The material above referred to was identified as Item "G" by reference.)

Mr. Goldberg: Mr. Examiner, we offer in evidence those

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items by reference.

Mr. Bury: We have no objection.

Mr. Everett: Mr. Examiner, it would be helpful to the staff if Mr. Goldberg would indicate the purpose he has in asking that these documents be incorporated into the record.

Mr. Goldberg: Yes, I will be glad to. Perhaps, in that connection, I might give you an indication of what appears on those pages.

For your convenience, Mr. Examiner, we have photostatic copies of the pages marked Item "C" by reference, which I will hand you in just a moment.

Page 23 from Item "C" shows the sinking and miscellaneous special funds account and the special deposits account of Southern California Edison Company, from which it is apparent that Southern California Edison is engaged in doing business in States other than California.

Page 39A is a page from Item "C" showing accrued and prepaid taxes, from which information appearing on that page it is apparent that business taxes are paid by Southern California Edison in States other than California. For example, Arizona appears, unemployment insurance tax in Arizona.

69A is the page which shows rent from electric property and interdepartmental rents, and that shows the rents paid by Southern California Edison to other parties for the operation of facilities for its benefit, and also the existence of proper-

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ties owned by Southern California Edison in the State of Nevada, for example.

Page 76 is another page showing rents charged to electric operating expenses, showing again properties outside the State of California.

Page 78 is the page for purchased power, showing on its face the purchase of power at Hoover by Southern California Edison from the United States Department of Interior and the Bureau of Reclamation.

Page 79A is a greater detail of purchased power, which shows the purchase of power from Metropolitan Water District and from other agencies.

Page 84 is more of the same, I would say, with respect to the operation of facilities in which Southern California shares the expense.

Now, the map which I hold here in my hand is a map of the system which, in part, you might say, duplicates Exhibit No. 1, but, in substantial measure, completes Exhibit No. 1 by showing, for example, in one of the inserts, the high-voltage transmission facilities owned and operated by Southern California Edison in the State of Nevada, from Hoover down to Chino, and also showing the area around the City of Colton and the lines around the City of Colton.

There are other details not particularly pertinent to this proceeding, for example congested area of Los Angeles

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County, but we had the whole map photostated.

That in general is the objectives of incorporating these materials.

Mr. Everett: Thank you, Mr. Goldberg.

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Presiding Examiner: Items "C", "D", "E", "F" and "G" will be received in evidence.

(The material heretofore identified as Item "C" through "G", inclusive, were received in evidence, by reference.)

Mr. Goldberg: Mr. Examiner, as Exhibit No. 8, we would like to have marked a certified copy of the qualification of Southern California Edison Company as a foreign corporation in the State of Nevada.

I will hand the original certified copy to the reporter, together with a photostatic copy.

Presiding Examiner: It will be marked Exhibit No. 8, for identification.

(The document above referred to was marked for identification as Exhibit No. 8.)

Mr. Goldberg: We offer it in evidence, Mr. Examiner.

Mr. Bury: No objection.

Presiding Examiner: Hearing no objection, it will be admitted.

(The document heretofore marked for identification as Exhibit No. 8 was received in evidence.)

Mr. Goldberg: Next, Mr. Examiner, as Exhibit No. 9, we

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should like to offer a certified copy of the documents of Southern California Edison Company, filed in the Office of the Arizona Corporation Commission on May 23, 1921, showing its qualifications to do business in the State of Arizona.

Here again, I will tender to the reporter the original, plus a photostatic copy, and we offer in evidence Exhibit No. 9.

Presiding Examiner: The data will be marked Exhibit No. 9 for identification.

(The data above referred to was identified as Exhibit No. 9.)

Presiding Examiner: Did I understand you to say, Mr. Bury, you had no objection to its being received in evidence?

Mr. Bury: No objection.

Presiding Examiner: Staff?

Mr. Everett: No objection, Mr. Examiner.

Presiding Examiner: It will be received in evidence.

(The data heretofore identified as Exhibit No. 9 was received in evidence.)

Mr. Goldberg: That completes our presentation, Mr. Examiner.

Presiding Examiner: Do you have any witnesses, Mr. Bury?

Mr. Bury: Yes, just one second, please.

To perhaps be able to expedite the thing, a little outline of just the way we intend to proceed: We have four witnesses, the first of whom will be Dr. Sorensen, from Cal-Tech, who will

give some—will testify briefly on some of the electrical energy matters involved in this case.

He will then be followed by Mr. Sample, who will present some studies which we have prepared on a calculator known as an A.C. network analyzer.

We will then follow with Mr. Montgomery, vice president of the company, who will testify generally as to the company's properties and their method of operation, with particular reference to Hoover. And we will then follow with Mr. Ashley, who will present some of the rate history, the history of our relationship with the City of Colton, and will present an exhibit which really is an outgrowth of Exhibit 4 presented by the staff, and

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will attempt to reconcile the differences which apparently exist on Exhibit 4.

Dr. Sorensen.

ROYAL W. SORENSEN

was called as a witness, being first duly sworn, and testified as follows:

Direct Examination

By Mr. Bury:

Q. Dr. Sorensen, would you state your name and address for the record, please?

A. Royal W. Sorensen, 384 South Holliston Avenue, Pasadena, California.

Q. Are you connected with the California Institute of

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Technology in Pasadena, California? A. I am and have been since 1910.

Q. And what is your present association with Cal-Tech? A. I am Professor of Electrical Engineering, Emeritus, with all of the privileges that I once enjoyed on the campus, except that of teaching class and getting salary checks. I can do research or do consulting.

Q. Doctor, at my request did you prepare an extract of your biography as it appears in "Who's Who in America", Volume 31? A. What would you like——

Q. Is this the extract which you had prepared? A. Well, I have a copy of that. That is a forthcoming condensation of my experience, which will appear in the next issue of "Who's Who in America." Other "Who's Who in America", dating way back almost to about 1912, I believe, did, for the most part, contain my corresponding history.

Mr. Bury: Mr. Examiner, if there is no objection, I would like to have the reporter simply copy it into the

record. I have copies which I can distribute to the other parties if they would like.

Presiding Examiner: It will be copied into the record and made a part of Dr. Sorensen's testimony at this point.

Mr. Bury: With the exception of the material in parentheses at the bottom of the sheet, which I have stricken on the

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copy of the reporter.

WHO'S WHO IN AMERICA (VOL. 31)

SORENSEN, Royal Wasson, educator; b. Wabaunsee County, Kan., Apr. 25, 1882; s. Soren and Margaret E. (Wasson) S.; B.S. in Elec. Engring., U. Colo., 1905, E.E., 1928, D.Sc., 1938; m. Grace Milner, Apr. 26, 1906; children —Jennie Marguerite, Grace Helen, Royal Milner, Georginia (dec.), Lewis Robert. Asst. engr. Golden Illuminating Co., 1900; testman Gen. Electric Co., 1905-06; research and design engr. transformer dept., 1906-10, consl engr., 1929-30; assoc. prof. elec. engring. Cal. Inst. Tech. (formerly Throop Poly. Inst.) 1910-11, prof., 1911-50, chmn. faculty, 1938-39, spl. lectr., 1950-52, prof. emeritus elec. engring, 1952—. Mem. sci. adv. group to Japan, Nat. Acad., 1947; cons. engr. Cole Electric Co., U.S. Electric Mfg. Co. Met. Water Dist. of So. Cal.; cons. Kelman Electric Co., Cal. Portland Cement Co., So. Cal. Edison Co. Planned and designed equipment 1,000,000 volt cascade transformer system and lab.; invented (with Dr. Robert A. Millikan) vacuum switch for high potential electric circuit, other inventions; spl. radio instr. Signal Corps, S.A.T.C., mem. research com. for submarine detection, World War I; coordinator Radio courses, supr. courses war tng. program for engring sci. and mgmt. U.S. Office Edn., World War II; asso. dir. spl. studies group Colum-

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bia U. Div. War Research, 1943-45; mem. engring, div. NRC, 1942-45; mem. Cal. Bd. Registration for Profl. Engrs.

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1947-55; exec. sec. Joint Research Council on Power Plant Air Pollution Control, 1956—rep. Am. Inst. E.E. to Centennial Verein Deutscher Ingeniere, Berlin, 1956; mem. Conf. Internationale des Grands Reseux Electriques a Haute Tension. Recipient most valuable engring service scroll Engrs. and Architects of Los Angeles, 1944; award for outstanding achievement air pollution control Los Angeles County Bd. Supervisors, 1958. Fellow Am. Inst. E.E. (research com. 1923-30, chmn. 1941-43, v.p. 1933-35, dir. 1937-40, pres. 1940-41, pres. mem. bd. 1941-43; hon. men.); mem. Air Pollution Control Assn., Nat. Soc. Profl. Engrs., Am. Soc. Engring. Edn. (mem. mission for tech. coll. study in India 1958-59) Pasadena Tb Soc. (v.p.), Los Angeles, Pasadena chambers commerce, Royal W. Sorensen Fellows (hon. pres.), Soc. Promotion Engring, Edn. (gov. bd. 1938-40, v.p. 1938-39, chmn. com. grad. study 1942-43) Engring. Council of Founder Socs. So. Cal., A.A.A.S., Am. Assn. U. Profs. Pasadena YMCA (pres. 1933-39), Japan Inst E.E. (hon.), Sigma Xi, Tau Beta Pi. Republican. Baptist. Mason. Clubs: Joint Tech. (Los Angeles); engineers, Twilight (Pasadena); Rotary. Author tech. articles, papers. Home: 384 S. Hollisto. Av., Pasadena, Cal.

Mr. Bury: Excuse me, Mr. Examiner, did I hand you a copy of this? I am sorry.

Presiding Examiner: Thank you.

By Mr. Bury:

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Q. Dr. Sorensen, would you outline very briefly your association with California Institute of Technology, the

type of work you have done there? A. In 1910 I was invited by the California Institute of Technology, then Throop Polytechnic Institute, which, prior to the development of that program, had been primarily an academy; I was invited to come and open up a Department of Electrical Engineering. That I did, and, though not intending to stay, I stayed teaching until I reached retirement age in 1952, and served as head of the department from the beginning of my work until I reached 68 years of age, in 1950, and relinquished the executive position but continued to teach two years more.

Q. In addition to your teaching activities, did you also —were you also engaged in performing consulting services and doing research work? A. Being reluctant to go into teaching, although providence and former professors kept trying to push me into it, I made an arrangement with the college when I went there that if I did not impair my teaching ability and my administrative college ability, I should have the right to do consulting engineering outside. That was in order to enable me to take care of my family somewhat better than teaching salaries would provide.

Q. And did your consulting and research work relate

itself generally to problems involving the electric power systems? A. Almost entirely so. My first work, relating to power systems, my first work of importance, was with the Pacific Light and Power Company, beginning about 1912, when I helped them untangle some transmission power difficulties. Then, during the construction of the Big Creek system, which went into operation in 1913, I was regularly on what you might say full-time employment, in part with the college program, as consultant on that Big Creek system, which was essentially the first long high-voltage system set up in the United States.

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I had charge of the high-voltage arrangements, including the transformer, the switching equipment, the transmission lines, checking the calculations with the contractors and reporting back to Pacific Light and Power. Pacific Light and Power became a part of the Edison Company in 1917.

That system was operating well, the Edison Company had a large engineering staff, and my permanent consulting program, receiving continuous compensation, ended at that time, and with the Edison Company it has been intermittent until about four ago (sic), when they called me back in.

Q. Doctor, in connection with certain of your research and development work, were you and others responsible for the invention or development of certain important high-voltage equipment for transmission systems?

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A. In connection with the changeover which was coming to Big Creek in 1923, when the Edison Company proposed going up to 220,000 volts, or 220 kv, as we commonly say, rather than 150, the Edison Company proposed to me that they would build a high-voltage laboratory on the campus at California Institute of Technology, that to be the property of the college, if I would take charge of it and operate it.

I looked after that laboratory under that arrangement, although it was eventually turned over to Cal-Tech entirely, until about three years ago.

In that connection, of course, we developed a good many new things relating to the transmission of power over power lines at high voltage and over long distances.

One noticeable invention which I held patents on and turned over to the college was the new development in vacuum switching technique, which has recently come about and is proving quite valuable. I say "new devel-

opment" because the depression of 1930 stalled it off for about thirty years before it came into active use.

Q. Doctor, who did you work with on the development of that vacuum switch? A. That work mostly was with graduate students, although as we went along and discovered some of the features it became desirable to take out patents cooperatively with Dr. Robert Milliken (sic), because of his most excellent acquaintance with the

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physics of vacuum technique, and such things as that sort. That was a fairly natural program, because the history of Throop College is divided into several sections, you might say. It was an academy with a good reputation, as such, and in the training of men to teach drawing, shop work, and kindred techniques or arts of that kind, each including domestic science, I believe, until Dr. George Hale became acquainted with it in 1908 to 1910. And that resulted in the program which took me there in electrical engineering in 1910. Up until 1920, because of limitations of science departments and mathematics departments and money, we were busy developing a college which would gain a reputation in engineering, and succeeded quite well in doing so.

In 1920, Dr. Millikan had become convinced, and just before that Dr. Noyes from M.I.T. had become convinced that there was a good field of opportunity in the sciences at that college, and the name was changed shortly thereafter to California Institute of Technology, when our declaration said it was a college of science and technology and research, rather than just a college of engineering.

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Q. Doctor, in your association with Cal-Tech and your work there over the years, have you kept yourself abreast of all the new developments in the fields of electric engi-

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neering, and physics and related matters? A. I have tried to do so. My sense of responsibility was stimulated or provoked or frustrated, more or less, when Dr. Millikan in coming to the Institute said that he would like to have the Department of Electrical Engineering in the Physics and Mathematics Division rather than the Engineering. After getting over the enormity of the thing, I agreed. And from then on, of course, my pride in trying to keep up my end of the program kept me attending physics conferences, mathematical conferences, and going to seminars quite regularly for a long time. So I do feel that I have had an unusual opportunity for an engineer to know what has been going on in the development of knowledge of the use of electricity in all of its various phases.

Of course, we all know that since radio and since World War II, the phenomenal things have changed the knowledge of the use of electricity have been most interesting. Some of my former students, of course, have talked with me and I have to keep up with them and they are making great reputations at the present time.

Q. Doctor, were you here yesterday to hear Mr. Miller testify?

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A. I was.

Q. And have you seen Exhibits 1, 2 and 3 which were the map, the single line diagram and the power flow data introduced by Mr. Miller? A. Yes, I have. You are mentioning Mr. Miller, is that right?

Q. Yes. A. Yes. I am not quite sure. All right.

Q. Did you hear Mr. Miller testify to an opinion that energy generated at Hoover Power Plant and Davis Power Plant located outside of the State of California was delivered to the City of Colton? A. I did.

Q. I hope that is a correct summary of the opinion he expressed.

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Doctor, from the testimony that you heard and the exhibits and from your own experience and qualifications, do you agree with that opinion?

Mr. Goldberg: I object, Mr. Examiner. We have had no foundation laid for the expression of an opinion by this witness with respect to that subject matter.

I have read the witness' qualifications as they appear in "Who's Who," and as supplemented by the oral examination this morning, but I have heard nothing yet which in any way gets into this matter of tracing electrical energy, from the source

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to the point of consumption. I submit before this witness may be permitted to express an opinion we must have a foundation showing his qualifications to express an opinion and the studies he has made which enable him to express that opinion. Obviously the experience he may have had, incidentally, in that connection with respect to other companies tells us nothing about the situation on Southern California Edison's system from the period 1954 to the present time.

Mr. Bury: If the Examiner has no objection, I will so qualify the witness.

Mr. Goldberg: And I might add further that we think that it is utterly immaterial and irrelevant what this witness' opinion may be with respect to Mr. Miller's conclusion or testimony. It is only proper that this witness be brought forward, based upon his own qualifications, his own experience and his own performance in relation to the facts of this case, to state his own opinion.

Presiding Examiner: Well, Mr. Goldberg, in connection with your objection, it is in two parts. The first part, as to qualifications, I would be inclined to overrule that objection.

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The second part, as to his examination or study that he may have made of Southern California Edison's properties, I would be inclined to sustain your objection, unless further basis is laid for that question.

Mr. Bury: I will go on if that is appropriate, although——

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Presiding Examiner: I give you the opportunity now.

Mr. Bury: Thank you.

By Mr. Bury:

Q. Doctor, yesterday during Mr. Miller's testimony reference was made to the Staff Engineering Report which was prepared and served upon the parties to this proceeding. Have you had an opportunity to see and to study that report? A. I have seen the report, I have given it some study, but not a detailed study. There are men qualified who know all about the Edison system who can handle that sort of thing.

Q. Doctor——

Mr. Goldberg: Let me have the reporter read that last sentence, which I lost.

Presiding Officer: Will you read the answer?

(Answer read.)

The Witness: By "that sort of thing" I mean the details of how the Edison system operates.

By Mr. Bury:

Q. Doctor, have you also seen a diagram, a single line diagram of the Edison Electric System which has been identified in this record, I believe, as Item A? A. This diagram of the system I have seen.

Q. Doctor, assuming for the purpose of this question that all of the statements contained in the Staff Engineer-

ing Report are true and correct and that all of the testimony given

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by Mr. Miller is true and correct, and that that single line system diagram correctly represents schematically the Edison Electric System, do you agree with the conclusion drawn by Mr. Miller which I mentioned before?

Mr. Goldberg: Mr. Examiner, I must pursue the objection. As a matter of fact, statements of this witness a few minutes ago underline the importance of the objection we have made here. We are not in any way disputing that we have here a man eminent in the field of electrical engineering, but that is not the issue.

The question is whether he has made studies with respect to the operations of this system over the period here involved in order to enable him to reach a conclusion with respect to the flow of energy on the system from its source to points of consumption on the system.

Just a moment ago this witness said that he has some familiarity—these are not his exact words, everyone has heard them and I need not be held to them—some familiarity with this Staff Report which the Federal Power Commission Order refers to, but he went on to say that there are other men who are qualified, know the details, who can deal with the sort of thing involved in that report.

We still have no foundation here which entitles him to express an opinion that the energy originating in Hoover does not reach points of consumption in California, particularly

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the City of Colton.

Mr. Bury: I think I can answer that objection with one more question.

Presiding Examiner: All right, ask your question.

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By Mr. Bury:

Q. Doctor, is the preparation of studies or a knowledge of the manner of operation in detail of the system of Southern California Edison Company in the manner referred to by Mr. Goldberg necessary for you or any other qualified electrical engineer to express an opinion on the soundness of the conclusion drawn by Witness Miller?

Mr. Goldberg: Mr. Examiner, I object to that. That, itself, is utterly without foundation and you cannot lay a predicate for the other questions by asking another question equally unsound. And we press, further, our objection that the question is not here whether this witness agrees with Mr. Miller or not. What we are concerned with here is: What can this witness testify to with respect to the tracing of flows? And we will examine him on that. As I get it, he hasn't made any such studies. We are going to have some other witness, a Mr. Sample, who may have been involved in that sort of a thing, this AC network analyzer. But we will wait until we meet Mr. Sample.

Mr. Bury: I withdraw the question.

Presiding Examiner: Mr. Bury, the issue here, as you know,

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is whether or not the sale of power or electric current by Southern California Edison to the City of Colton moves in interstate commerce and that is a wholesale sale for resale.

Now, witnesses have testified for the Staff that it did move in interstate commerce. It is not sufficient for you to put a witness on the stand to say that Staff witnesses' testimony is incorrect. That isn't proper rebuttal, so to speak——

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Mr. Bury: May I make a comment at that point. We know one thing in this proceeding, and that is that we do not have the burden of proof. As a matter of fact it is very fortunate that we don't because certainly a negative proposition that energy generated outside of the State of California does not reach the City of Colton—we are not faced with that burden of proving that negative proposition. What we intend to show here is that the method and the scientific or semi-scientific basis of the analysis made by Mr. Miller is invalid.

Presiding Examiner: Well, Mr. Bury——

Mr. Bury: Perhaps we can avoid this by withdrawing the question and taking the direct approach, qualifying this witness to express his own opinion, and we can follow that approach if we wish, rather than commenting on the opinion indirectly expressed by Mr. Miller.

Presiding Examiner: Let me say this, that from Southern California Edison I heard no demurrer as to the evidence of the City of Colton and the Staff as to the sufficiency of their

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evidence to carry the burden of proof.

Now, it is not my province to try to tell you how to try your law suit. I will rule on the objections as they come along.

Mr. Bury: Well, I did want to indicate this, just so we know where we are headed here: Edison has admitted in its answer that it receives at Hayfield energy generated at Hoover Power Plant. That is not disputed.

Mr. Goldberg: Are you making that concession?

Mr. Bury: The issue here is whether or not that energy may be traced or identified as going to the City of Colton. We do not have to prove—the Staff has that

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burden. Rather than make something in the nature of a motion for non-suit or some other similar pleading at this time, we feel that we can better, through the use of Dr. Sorensen's testimony, demonstrate that the proof is insufficient, and why.

Presiding Examiner: Then trace your current rather than saying that the Staff witness didn't know what he was talking about.

Mr. Bury: All right.

By Mr. Bury:

Q. Dr. Sorensen, does the information which you have obtained, both from the Edison Company and from your experience—from that information have you an expert opinion regarding whether or not energy generated outside of the State

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of California is delivered to the City of Colton?

Mr. Goldberg: The question now is only whether he has an opinion. As to that I have no objection.

By Mr. Bury:

Q. Do you have an opinion? A. I have an opinion that there is no——

Mr. Goldberg: Now just a minute.

Presiding Examiner: That question you can answer "Yes" or "No."

The Witness: Yes.

Mr. Goldberg: All right.

By Mr. Bury:

Q. Doctor, what is that opinion?

Mr. Goldberg: Now I object, Mr. Examiner. We are right back to the same problem. We have been asked that

this witness express an opinion. There is no foundation laid for it. As a matter of fact there has been a reference to information that he may have examined that hasn't even been brought into the record yet. Now let's have first things first. Let's find out what this witness did that enables him to reach an opinion. It isn't his past experience that enables him to reach an opinion. His past experience may have a bearing on what weight is to be attached to that opinion, all other things being considered. But what did he do? Just read some report, decide whether this is enough? Are we to examine a witness on

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conclusions? On disagreements with other witnesses in this case?

Presiding Examiner: Mr. Bury?

Mr. Bury: I think we fully qualified the witness. We believe he is in a position to express that opinion, if for no other reason, based solely on his education and experience in connection with his activities at Cal-Tech, and his knowledge of the principles of physics and of electrical engineering, to express an opinion of whether or not energy generated outside of the State of California is delivered to the City of Colton.

Mr. Goldberg: Mr. Examiner, Mr. Bury would have to demonstrate not only that this witness knows the principles involved in the transmission of electrical energy, if that is an appropriate term to apply to them—I am a mere layman, I don't know—but he would have to demonstrate that there are violations of those scientific principles by the methods followed by the Staff.

Mr. Bury: We sure shall.

Mr. Goldberg: Well, do it in a proper way.

Mr. Bury: I will let the question stand.

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Presiding Examiner: Mr. Bury, the objection will be overruled, but this will be subject to a motion to strike later on unless you lay the proper foundation for it. With that understanding you may go ahead.

Mr. Bury: I am not quite sure I understand wherein the

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foundation is insufficient. It certainly seems to me that we have qualified this man to express the opinion we have requested of him. We have shown him not—not only what his educational background and his training and his experience, but we have developed what information was supplied to him and have asked him if that information was sufficient for him to have a foundation for an opinion and he said it was sufficient information and he says he has an opinion and I have asked him for it.

Presiding Examiner: The witness said that he had made a limited examination of the Staff Report of their field examination. If I can draw a comparison: I made a limited examination of some of the authorities before I came over to hear this case and certainly my limited examination of those authorities won't qualify me yet to write an opinion.

Mr. Bury: But I asked him further, whether or not such information as he had was a sufficient basis for the expression of an opinion by a qualified electric engineer.

Mr. Goldberg: We don't each really know yet what that information is. For example, there has been a reference to information other than the Staff Report. We don't even know what portions of the Staff Report he considered, what he gave much weight to, what he didn't give much weight to; none of the basic elements are developed.

We would have this situation: If he expressed an opinion

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that Mr. Miller's testimony is erroneous, we would be in the position of having, through cross-examination, to bring out the facts that Mr. Bury should be bringing out.

Mr. Bury: I don't believe that is correct.

Mr. Roos: If I may say something, Mr. Examiner: I think the situation resolves itself down to this, that Mr. Bury has asked the witness if, assuming that the testimony presented yesterday by Mr. Miller, assuming that those factual statements are true, which the witness must assume for the purpose of reaching his conclusion—the question now before the Examiner is whether, assuming those factual statements which are now in evidence before this hearing, whether, basing your opinion, or basing the witness' opinion upon those statements and the Staff Report referred to by the City of Colton, if the conclusion as reached by the witness Miller yesterday is sound, with a scientific basis. I believe that is the situation and with the present state of the record I feel that the witness is entirely competent and qualified to answer that question, because he is basing his opinion upon the evidence which is already in the record.

Mr. Goldberg: Mr. Examiner, I am not going to reargue what Mr. Roos has stated, because we have been all over that, and the Examiner has indicated his view that there hasn't been a sufficient foundation laid and it simply isn't proper, and we are not concerned with this witness commenting on another

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witness' testimony.

Mr. Bury: That is not the question to the witness at this time.

Presiding Examiner: It is my opinion that the witness ought to—that you ought to show by this witness that he

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has made some study of the Southern California facilities, especially those involved in the sale in question, and based upon that study, whether he has formed an opinion.

Mr. Everett: Mr. Examiner, in Mr. Miller's testimony he traced the flow of energy. It would seem appropriate that Mr. Bury's witness, Dr. Sorensen, should be shown to have had some experience in having traced power flows, in order to——

Presiding Examiner: Mr. Everett, that is what I am trying to get Mr. Bury to do, but then I am not here to tell him how to try his law suit. I am only here to rule on the objections as they come along. I have been trying to help him, however.

You may proceed, Mr. Bury.

Mr. Bury: May I request we take the morning recess at this time.

Presiding Examiner: We will take a fifteen-minute recess at this time.

(Whereupon, at 11:11 o'clock a.m., the hearing was recessed until 11:25 o'clock a.m.)

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Presiding Examiner: Are you ready, Mr. Bury?

Mr. Bury: Yes.

Presiding Examiner: Proceed.

By Mr. Bury:

Q. Dr. Sorensen, will you tell us what personal knowledge you have of the Edison Electric System? A. I have a very close personal knowledge and I have a knowledge of the area involved, which started long before the Edison Company owned it. That system which we are describing is Highgrove, Pedley, Colton and so forth and so on was a part of the Pacific Light and Power Company for which I became consulting engineer in 1912 and for which I con-

tinued until 1917. I had much to do with all their scheme of developing power and overcoming any of the difficulties they had when we kept going to higher voltages. So that area is not at all a strange area to me. I am acquainted with its operation.

Now, on the Big Creek system, I was almost—well I was always in contact with it from 1912 until 1917. I went up to the power stations on that new line which presented new problems, into Los Angeles, and I taught the operators how to operate it. They could not operate it and keep the voltage controlled with the amount of generating capacity that was up there in Station 1.

Q. Doctor, do you have personal knowledge of the Edison

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Electric System as it exists today? A. I have a personal knowledge of almost all of the details. I have acquaintance with all of the power stations except the two that are now under construction; they are thermal stations down along the beach. I have not visited those two. There aren't any other power stations except that of the Mammoth Station that I have not visited fairly recently.

Q. Do you have personal knowledge of the electric systems or portions of the electric systems of the U.S.B.R. and the Metropolitan Water District which are shown on Exhibit 1, the map? A. All during the construction period of the Metropolitan Water District I was a member of the Metropolitan Water District Consulting Board. It was my function to pass upon all of the electrical plants. I went down the Colorado River with the engineers and consultants of that Board before Hoover Dam was started. I followed it all the way through. Many of the recommendations regarding the construction of the transmission lines and the electrical features of the whole

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system were either approved or initiated by me. And I followed that through. I suppose technically I am still a consultant for the Metropolitan Water District although the last few years I don't think they have asked any consulting advice. They have never cancelled the arrangement. It is a per diem arrangement.

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Q. Doctor, have you had experience with making load flow studies on electric transmission systems? A. I have had experience of analyzing load flow studies on transmission systems. I have taught transmission line phenomena for many years, using the most modern up-to-date developments as they came along, and I think probably I know transmission line operation and systems as well as any one individual can. And I have had, as I said, the closest contact. Even now I am helping design for the Kelman Electric Company circuit breakers. I have helped the Kelman Electric Company to design 200,000 ampere testing transformer for testing circuit breakers. They are now a part of ITE Company and I am still on their consulting staff, the ITE Staff. I am not unacquainted with what is going on.

I have recently been to both the Edison Power substations and the Bureau of Power and Light substations and checked over the circuits when we have been testing these circuit breakers to see how they operate on the circuits. I have studied your diagram and I know what you have.

Q. Doctor, have you made a sufficient study to express an opinion on power flows in portions of the U.S.B.R., M.W.D., and Edison Electric Systems?

Mr. Goldberg: I object to that. I would not object if counsel would ask the witness what studies he made. I shouldn't be required to drag that out of the witness on cross-examination—

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I withdraw that word "drag"—to ask the witness about that on cross-examination.

By Mr. Bury:

Q. Doctor, what studies have you made of the Edison Electric System?

Mr. Goldberg: In connection with this case?

The Witness: Well, operational studies, if you please, and particularly when there is any malfunctioning of operation, to see why it didn't operate right. What did one system do, what does another system do? If something happens in Vernon, as it once did, and we couldn't trace it, why did we find that the trouble occurred out near San Bernardino?

By Mr. Bury:

Q. Doctor, are you familiar with the electrical conditions on the Edison System? A. I think I am.

Mr. Goldberg: May I ask counsel for my benefit simply to tell me what he meant by "electrical conditions"? I am very much in the dark.

Mr. Bury: Let me rephrase the question, and perhaps it will help.

By Mr. Bury:

Q. Doctor, are you familiar with the electrical characteristics of the Edison System in the manner in which it is operated? By that I mean: Do you know what phenomena occur

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in the way of load flows within the Edison System? A. That is such a broad question it needs some detail. If you said: Do I know what occurs exactly at the Man-

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dalay station which is just being completed, I would have to say no. If you say: Do I know how the Edison Company dispatches their operation, how the network is connected, the fact that it is a network system and things of that sort, I know as much about it as any man can know who isn't assigned to a specific problem. If I were assigned to a specific problem my knowledge would be more limited than it now is because it would be a detail problem.

Q. Doctor, do you have an opinion as to whether or not energy generated at Hoover or Davis Power Plants is delivered to the City of Colton?

Mr. Goldberg: I object to that, Mr. Examiner. The preliminary questions that Mr. Bury has been putting to the witness, in order to develop for the record his knowledge and basis for the expression of opinion, have failed to show that this witness has studied the specific problem here involved and has made particular studies with respect to that problem and has come up with an answer. He stressed the breadth of the questions Mr. Bury was putting to him and pointed out, If you are talking about a specific problem, that is something else again.

Mr. Bury: I will ask another question.

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By Mr. Bury:

Q. Dr. Sorensen, have you made a study to determine whether or not energy generated at Hoover and Davis Power Plants reaches the City of Colton? A. I have.

Q. What is that opinion?

Mr. Goldberg: Now, let's have the study first. Let's have a description of that study.

Mr. Bury: Excuse me. I misstated the question. I am sorry.

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By Mr. Bury:

Q. What does that study show?

Mr. Goldberg: I object to that. Let's first find out, Mr. Examiner, what the studies consisted of.

By Mr. Bury:

Q. Dr. Sorensen, what did your studies consist of? A. My study consisted of bringing myself up to date on the schematic program of the Edison System connections as described in the drawing to which we made reference a while ago. I have looked over this brief or whatever you call it, Docket E-6821, it is named. I have looked at those figures. In my analysis the figures are not particularly important because those of us who have kept up to date on the developments and what we have learned about electrical energy transmission and usage, know full well that there is no physical

means by which we can identify a quantum of electricity as coming from one place and going to another, if you have a network. It is utterly impossible to do so.

Mr. Goldberg: Mr. Examiner, I move to strike the answer because obviously the answer went beyond the question and I cannot undertake, unless we have the reporter read it back to me, those portions of it that go beyond the question. And let me just say here that it may be said almost as a matter of law that these extraneous opinions expressed cannot stand. This Federal Power Commission has been too long engaged and has been too often sustained in the courts, including the Supreme Court of the United States, in tracing electrical flows and determining jurisdictional problems on electrical networks such as we have here.

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Mr. Bury: Pardon me. I would agree that the last sentence of Dr. Sorensen's answer was beyond the purview of the question. However, I would agree that power flows or the attempt to determine whether or not energy generated at one place is used at another place is a factual question and the subject of expert opinion by electrical engineers. And if we can show, and we intend to show, that the conclusion drawn by the witnesses for Colton are invalid, and if that is true they have not carried the burden of proof. And that is not a legal question.

Mr. Goldberg: Mr. Examiner, Mr. Bury must know that questions of fact tried, retried and tried again and dealt with

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by the courts and finally settled no longer are questions of fact but are matters of law, and that what they are trying to do here is establish that there are certain principles that preclude the tracing of energy, and I just say that has utterly been determined against them.

Mr. Bury: I want to make a short response to that. That certainly is true, we want to develop these principles. As far as legal precedents are concerned we have intended in our foundation, and we are leading toward, a showing that there are principles for the analysis of electric systems which did not exist and were unknown at the time of the precedents to which you refer, and I am quite sure that the law is going to follow developments in the arts and sciences as they occur.

Mr. Goldberg: Mr. Examiner, let's not stray too far from my pending motion to strike the answer.

Mr. Bury: We will stipulate that the last sentence of Dr. Sorensen's answer may be stricken as non-responsive.

Mr. Goldberg: I don't know whether it is only the last sentence. To me everything after he said "The figures are not important" was beyond the scope of the question.

Mr. Bury: When he said the figures were not important, he certainly was commenting on the study he made.

Mr. Goldberg: Then he went off.

Presiding Examiner: Let's have the answer read back.

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(Answer read.)

Presiding Examiner: That part of the answer starting with "know full well," from there on to the end of that answer will be stricken from the record at this time.

You may proceed.

By Mr. Bury:

Q. Doctor, based upon your study do you have an opinion as to whether or not electric energy generated at Hoover or Davis power plants reaches the City of Colton?

Mr. Goldberg: The question is only whether he has an opinion. I have no objection to that.

By Mr. Bury:

Q. Do you have an opinion, yes or no? A. I don't really know. I know that you can't identify it going from outside of the state or any other point into Colton as a quantum of electricity that came from any particular source and went to Colton.

Mr. Goldberg: Let's have the answer read. Let's have that read because I think I would have to move to strike parts of it and I would like to get some understanding of part of it that may be relevant.

Presiding Examiner: Will you read the answer.

(Answer read.)

Mr. Goldberg: I move to strike all of the answer after "I don't really know." I take it "I don't really know" means

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"I don't really know whether I have an opinion."

Presiding Examiner: The objection and the motion is overruled.

The Witness: What is that?

Presiding Examiner: I left it in the record.

The Witness: Excuse me.

Mr. Goldberg: In view of that fact, Mr. Examiner, may I have that answer again?

Presiding Examiner: Certainly. Will you reread it, Mr. Reporter, for Mr. Goldberg.

(Answer read.)

Mr. Everett: Mr. Examiner, has the witness told us what he means by a quantum of electricity?

Mr. Bury: We will develop that, if you wish.

By Mr. Bury:

Q. What do you mean by quantum? A. I mean a quantum of energy in the form of electro-magnetic energy, which is what we are dealing with.

Q. Doctor, why do you not express an opinion as to whether or not the energy generated at Hoover or Davis power plants reaches the City of Colton? A. I have no way of proving whether it does or does not.

Q. Why? A. There isn't any.

Q. Doctor, is it possible in an electric system with

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several generating sources and an interconnected transmission system to identify quantums of electric energy delivered to a particular load on that system with the source of generation? A. May I hear that again? I lost part of it.

Presiding Examiner: Yes. Will you read the question, Mr. Reporter?

(Question read.)

The Witness: Assuming there are numerous loads, also?

By Mr. Bury:

Q. Yes. A. Yes. It is not.

Q. Doctor, what new developments have taken place with respect to the understanding of what occurs in electric systems such as Edison within the last twenty years?

Mr. Goldberg: I take it, Mr. Bury, the relevance of this relates back to your prior statement to the Examiner that since the precedents I had referred to there have been developments which make those precedents in your view inapplicable?

Mr. Bury: I think that is generally correct. I think the statement may be a little broader than that.

The Witness: Well, of course——

Mr. Goldberg: Excuse me. As the witness is starting out to say, there are so many, let's ask the witness to confine it as they apply to the Edison System.

By Mr. Bury:

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Q. As they apply to the Edison System? A. We are discussing now the transmission of electrical energy.

Q. Yes. A. We are not discussing the design of any of the equipment or anything of that sort.

Mr. Goldberg: What kind of equipment?

The Witness: The physical basis of the transmission of electrical energy.

Mr. Bury: Let me rephrase the question and I think we will narrow it down a little bit.

By Mr. Bury:

Q. Doctor, would you outline the developments which have occurred in the understanding of the transmission of

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electric energy as it may apply to the Edison System? A. Yes.

Mr. Goldberg: Since when? The last twenty years?

Mr. Bury: That would be sufficient.

The Witness: In my long experience, which is over fifty years, we first encountered a knowledge that a watt-mater (sic) was very puzzling to the electrical engineers of the day when we came into alternating current. We added to the basic laws, ohms and Kirchhoff's laws, the laws relating to conductance and reactance as developed by men like Kenelly, Steinmetz and others to follow and we gained some knowledge.

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As far back as 1908 I was with men and with a group that in our analytical discussions back at the General Electric Company we tried to analyze how electromagnetic energy travels from one place to another. We never reached a satisfactory definition that we could put our fingers on. We still are in the same state today. We know that we can transfer mechanical energy in the form of hydro-energy, thermal energy, or what have you, into a form of electromagnetic energy. We know we can direct it to the points where we want to use it. We once had a theory of ether that carried it through. That is all gone. We don't know what carries it through. But the thing we do know is that if we have a proper situation we can direct the flow of that energy as it is electromagnetic energy. When it gets dumped into a network we no longer can identify quantums of that electric energy. By "quantums" I mean any size piece you pick up, because the slug or what have you, it cannot be longer identified. After it crosses a point or surface borderline it is lost in the pool. The nearest thing I can come to that, and analogies are no good: I do business on credit, I don't get any money,

I get checks. I pay by checks, how can I identify what I have in the banking system? And this is more nebulous than that, it is harder to identify than to say I paid my dollars to the other fellow. It is just a matter of faith.

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By Mr. Bury:

Q. Doctor, is the analysis of the transmission of electric energy by the use of single-line diagrams a recognized method today of tracing electric energy? A. Not with the group of engineers that I travel with, and think we know what we are doing.

Mr. Goldberg: Let's identify that group of traveling engineers, will you?

By Mr. Bury:

Q. Doctor, would you identify some of the people who consider, I think as you said, the use of single-line diagrams as old-fashioned or obsolete? A. Well, that would be a long list. I haven't tried—we have some men on our staff, Dr. Gilbert McCann, Dr. Langmuir and Dr. Bacher of the Physics Department, President Dubridge, Dr. Lindvall—well, I could pull out a whole vocabulary of engineers that are what you might call educators along the modern developments in electrical engineering.

Q. Doctor, what method is most currently recognized as the proper one for the analysis or the solution of electric transmission problems today? A. Some of the forms of vector analysis, in its various classifications.

Q. Could you explain, perhaps, how that differs from the single-line diagram analysis?

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A. All of these analyses are mathematical, physical postulates. We do what we can—a line diagram is a postula-

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tor. If I have a switching station with a certain number of circuits feeding in and circuits feeding out, I can put watt-meters on, or watthour-meters, and I can measure the current flow or the energy flow by any points I choose to put them in, in there. And I can draw diagrams for that system, and if you say that system represents a series of lines, then you can draw a diagram and say this power comes in here and some of it goes here, a certain amount, and some of it goes here.

That is not a proper representation, because the connections are often only a little way apart, a few inches, or may be a foot, or it may be ten feet, it may be twenty feet, it doesn't make any difference. If you move one from here, and the other over there (indicating), the diagram flow that you would make by lines becomes entirely different, you still get in one particular line the same current you pull, because you hypotheticate (sic) it there. Then you adjust these others to show that you must strike the balance all around. So one can take any of these diagrams you have and you can make other diagrams that prove contrariwise to the diagram that was originally made.

I have never run across a case in my teaching of that and playing with it, where I couldn't do that thing if we had a multiplicity of circuits coming in and going out.

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Q. Doctor, referring to the use of single-line diagrams for power flow study, you have seen Exhibit 2, the single-line diagram Mr. Miller referred to? A. Yes. There are no figures on here, no numerical figures.

Q. Doctor, Mr. Miller testified that he used some care in the preparation of Exhibit 2 to represent the correct order of connection of circuits to the various buses shown thereon. Doctor, in your opinion, what is the significance

of the order of connection of circuits on buses in the analysis of the transmission of electric energy? A. It has no particular value.

Q. What is, in your opinion, the more correct representation of the multiple connections at the bus bars of receiving stations?

Mr. Goldberg: May I have that question read, please?

Presiding Examiner: Will you read the question, Mr. Reporter?

(Question read.)

The Witness: The kind of systems that we have in the diagrams are shown for the convenience of operating personnel. They must know where the circuit breakers are, they must know where the switches are, they must tell how you get one circuit into another, and so they must be itemized.

A correct analysis diagram, talking about the physics of

the program, is: if you are working in a one-plane form, that this should be an enlarged point, if you like, in order that you can get enough connections, and power is coming into that point and going out to that point.

Since it is an enlarged point, of course, we have distances. You can move the connections around on that point but it is still effectively a point. So it isn't logical, it isn't reasonable to say that electricity comes in here and because the connection is here it must go down that way. If you move that connection here, it would still be the same amount you measure in there going down on this lead, but it wouldn't go that way, it would go this way. And by drawing these diagrams, as you choose, and they do require care—you have to make a study to do it—

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you can make the energy flows go most any way you choose, so long as you keep them balanced, because we do know that all of the energy that comes in must go out, except there are some losses.

By Mr. Bury:

Q. Doctor, this type of analysis that you have referred to, which would consider the buses as a point, if you are considering a plane, is that analysis a recent development? A. Well, within the last—probably twenty years, 15, 20, 25, but it is a recent development in the history of electrical engineering.

Q. Is that a view or a form of analysis which has gained

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more wide acceptance in more recent times?

Mr. Goldberg: Is this the vector analysis you are referring to?

Mr Bury: Yes.

The Witness: With the group of people with whom I associate in my profession as physicists and mathematicians, yes. I don't know how far you can go over the population in the world and say that.

Mr. Bury: I think that is all we have of the doctor.

Mr. Roos: May I ask some questions?

Presiding Examiner: Mr. Roos.

By Mr. Roos:

Q. Doctor, you mentioned that a line diagram is a postulate. Do you mean by the use of the word postulate a theoretical possibility which is assumed to be correct for the purpose of solving a problem? A. That is right.

Q. From your knowledge of the Edison system, would you say that there are equally logical postulates which

could be diagrammed equally logical to the postulate proposed by Mr. Miller yesterday?

Mr. Goldberg: I object to that, Mr. Examiner. The question is broad, vague and indefinite. Let's be specific. Let counsel state a postulate to the witness and ask him whether that can be used on the Edison system. I don't know how that

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question can possibly be answered by the witness.

Mr. Bury: I would like to respond to that comment. Certainly, Mr. Roos is not here as an electrical engineer, and certainly what—if one postulate is invalid in this analysis, what other postulates may reasonably be made is certainly a matter of expert opinion and not one for lawyers.

Mr. Goldberg: We have here in Exhibit 2 a schematic diagram which is a representation of the Edison system, and that is not denied, and it isn't challenged, its accuracy isn't challenged. Now, the witness has said this represents a postulate used in solving a problem, just, I suppose, as you would use postulates in relation to this vector analysis for assuming a solution to a problem.

Now he is being asked what other postulates may be assumed, and I submit that the question may be referred only to the Edison system and be made specific. I recognize that Mr. Roos isn't an engineer any more than I am, but that doesn't excuse us from asking proper questions.

Presiding Examiner: Will you read the question to me, Mr. Reporter?

(Question read.)

Presiding Examiner: The objection is overruled.

The Witness: I think, without question, there are, probably more than one, without any doubt. I believe

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people who want to can make other postulates and draw other line diagrams

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which will show different conditions.

Now, what I say is that the diagrams that I have been shown and that have been submitted here do not prove, specifically, in any physical way that power goes from Hoover Dam to Colton.

Mr. Roos: Thank you, Doctor.

By Mr. Roos:

Q. Could you tell us how many sources of electrical energy enters the Edison system? A. Somewhere around seven, eight, nine or ten, something like that. I would have to count them up. If you count the little stations, Mill Creek system, and so forth, there are quite a lot of them.

Q. And are all these sources of energy tied into every part of the system? A. This diagram that I saw indicates to me that they are.

Q. And would you say that a postulate or a line diagram could be constructed from Colton to each one of these energy sources? A. If you go to all that work and make a lot of lines, yes.

Mr. Roos: Thank you. I have no further questions.

Presiding Examiner: Mr. Everett?

Mr. Everett: Mr. Examiner, would it be appropriate to take the noon recess at this time?

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Mr. Bury: We could return earlier, perhaps. That would be agreable to us.

Presiding Examiner: We will take the recess at this time and reconvene at 1:30.

(Whereupon, at 12:06 p.m., the hearing recessed to 1:30 p.m.)

AFTERNOON SESSION—1:30 P.M.

Royal W. Sorensen

resumed the stand as a witness and, having been previously duly sworn, was examined and testified further as follows:

Presiding Examiner: The hearing will come to order.

Are you ready, Mr. Everett?

Mr. Everett: Yes.

Mr. Examiner, the Staff requests it be permitted to postpone until after the company completes the presentation of its evidence the Staff's cross-examination of the company's witnesses.

Yesterday, and I also believe today, there was considerable reference in the record to a Staff engineering report. That report was served upon the parties to this proceeding including the company, last May. That is over six months ago.

The evidence which the Staff placed in the record yesterday did not vary in substance from what was contained in that report. There was one exhibit put in the record yesterday by the Staff, Exhibit No. 1, I believe, the geographic map, which had not previously been supplied to the company and to the other parties, but the testimony of Mr. Miller and the other exhibits, that is Exhibits Nos. 2, 3 and 4, were furnished to the company last May in the form of the Staff Engineering Report and the accompanying attachments to that Report.

So, in other words, the company has had since last May to examine and analyze and study the evidence which the Staff

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put in the record yesterday.

On the other hand—and this is not intended to be in any criticism of the company—it was not until this morning that the Staff knew what evidence the company planned to propose to present at this proceeding. Of course as of this time we do not know all that evidence because Mr. Bury indicated this morning that in addition to Dr. Sorensen there would be three other witnesses who would also testify.

Therefore, it seems to the Staff that fair play would require that the Staff have, to prepare for its cross-examination of the company's witnesses, at least a fraction of the time which was available to the company to prepare for an examination of the evidence which the Staff presented here yesterday.

Furthermore, while we have heard only one of the company's witnesses, his testimony was, admittedly, quite different from that given by Mr. Miller and that difference was surprising to the Staff in more ways than one. As indicated here this morning, I think by Mr. Goldberg, in some quarters these principles which were the basis of the conclusions set forth in Mr. Miller's testimony have become so well recognized by the Commission and by the courts that they are considered as having been almost codified into the law.

To permit a completion of the record in this matter, in order that the Commission may properly dispose of all the issues,

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it would seem appropriate that the Staff be given an opportunity to study and analyze Dr. Sorensen's testimony so that the Staff could make an examination which would be useful and complete the record in this matter.

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Mr. Goldberg: Mr. Examiner, I would join in the Staff's request. I think it is entirely reasonable that there be afforded the Staff and us some reasonable opportunity to study the technical testimony that is being presented by Southern California Edison, and I think in that connection it is more expeditious if we hear all of the direct case of Southern California Edison before taking that time, because otherwise we might be in the situation where we have some recess to prepare for cross-examination of Dr. Sorensen, we would return only to find that we need some additional time to prepare for the cross-examination of Mr. Sample, for example; whereas, by hearing it all at once and taking one recess we can deal with all of the testimony that needs to be cross-examined.

It may be when we hear the testimony of Mr. Montgomery, for example, and Mr. Ashley, that as to those two witnesses we may be able to dispose of them while we are here in this session.

Mr. Bury: I have this comment. I can appreciate, certainly, the reasonableness of the request of the other parties who want to consider this testimony before they cross-examine. The only problem I have is trying to accommodate the

doctor's schedule and his physical limitations to the extent that I can. I would assume from the comments that you gentlemen would not feel prepared to cross-examine Dr. Sorensen immediately upon the completion of our direct testimony, if we went on through it?

Mr. Goldberg: Well, let's defer an answer to that, for this reason: Let's assume that you completed all your direct case today and we were left only with the question of cross-examination; the matter of accommodating Dr.

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Sorensen might not be so very great because at that time we will be in a better position, perhaps, to give you some better estimate of the time we might require to prepare for cross.

Mr. Bury: Well, I would not think that we could complete the presentation of our direct testimony today, although it is possible.

Mr. Goldberg: Well, even if it were tomorrow. I didn't mean to limit it to today.

Mr. Bury: I am trying to avoid, of course, holding the doctor. I think there is some advantage if we could actually defer his cross-examination until the morning and give him an opportunity to rest. I am sure he would appreciate that. But I am faced with the problem of holding him here perhaps another day or another two days and then determining that it will take some considerable period of time to prepare. I would like to avoid that if possible.

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Might we do this? I have a suggestion: Why don't we go ahead and proceed with the balance of the direct presentation and perhaps you can advise us the very first thing in the morning whether or not you would like to proceed with Dr. Sorensen's cross-examination then or defer it for some considerable period of time? I mean if we are going to have a recess then I can turn the doctor free tomorrow morning.

Presiding Examiner: That certainly would be agreeable with me.

Mr. Goldberg: I think so. I think Dr. Sorensen can be excused certainly for the balance of the afternoon, except I would like to ask him one or two preliminary questions.

Mr. Bury: All right.

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Cross-Examination

By Mr. Goldberg:

Q. Dr. Sorensen, have you ever testified before the Federal Power Commission before? A. Yes.

Q. In what cases or case? A. In the case of the Ohio Public Service Company.

Q. Do you recall about when that was? About when was that? A. I think that was in 1942.

Q. And were you a witness for Ohio Public Service Company?

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A. I was a witness for Ohio Public Service Company.

Q. And can you tell us what the subject matter of your testimony was? A. No, I am afraid I can't. I do not have any transcript of that record. That was a long time ago. The substance of it was, in effect, the same sort of thing, in a way, that we have now. The difficulty of identifying electromagnetic energy properly.

But, as I recall the problem, it was entirely a different problem from this one which is now under consideration.

I wouldn't be prepared without a good deal of reference work to material which I do not have. I never thought I would be in another case of this kind and I have not kept a file of that sort of thing.

Q. I take it, then, that in connection with your testimony in this case you did not undertake to review your testimony in the Ohio Public Service Company Case? A. That is correct. I do not have even a brief of that meeting.

Q. Do you recall whether it had anything to do with tracing flows of electric energy? A. It had to do with whether some power that entered the system of the Ohio Power Company, then called part of the American Gas & Electric Company, now called the American Electric Com-

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pany, which in turn furnished power under contract from Philo generating station located in Ohio to the Ohio Public Service

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Company, and because the Ohio Power Company, the American Gas & Electric Company was an interstate power system since they had some power developed in Pennsylvania that went into their system, the question was did that make the Ohio Public Service Company come under the jurisdiction of the Federal Power Commission, although all of the activity of the Ohio Public Service Company was in Ohio? That is as much as I can recall of the situation.

I will admit that I looked for some information from Ohio Public Service when I was asked to do this and was a bit surprised when I couldn't even find a brief in the files in my office, and my secretary made a thorough search and said "We don't have it."

Q. When were you asked by Southern California Edison to address yourself to the questions in this case? A. I was on a trip in the East and when I arrived in Houston, Texas, about November 15th, I think that was the date, I found a letter there asking me to contact the Southern California Edison Company.

Q. And did you do so? A. When I got home on the 19th day of November—no, when I got home late the 19th, on Friday the 20th I called up Mr. Bury, whom I had never known before, and I think I went to see him that day and we had a brief talk. He furnished me with the information which is this file——

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Q. That is the Staff Report, is that what you are referring to? A. Well, whatever you call this.

Q. This is just for the sake of the record. A. He furnished me with that information and——

Presiding Examiner: It appears to be the Staff Report.

Mr. Goldberg: Thank you.

The Witness: —and some other information and we went over the story, and I went to see him again on December 1st and we went over the maps which we have seen here—not the ones you put on the exhibit, but the ones to which Mr. Bury has referred—and we went over a bit of other discussion of what had been done and then I prepared a little memorandum which I submitted to Mr. Bury as a draft of things for us to consider. That is the extent of my contact with Mr. Bury whom I did not know before this came up.

Then with what we have had opportunity to discuss here, I came in Monday and we have had a number of talks together since my arrival on that date. That is the complete history of this particular episode.

It was understood that my task was to be one dealing with the theory of electrical transmission into network systems. I know if I were called upon to draw line diagrams saying that other diagrams could be done, I would have to exercise the care and use the time that has been used by the group that have

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presented information for the Federal Power Commission, and that is a long, tedious job.

By Mr. Goldberg:

Q. And you haven't undertaken to do that? A. I haven't done that kind of work.

Q. I would just like to identify for the record what this "some other information" was that Mr. Bury fur-

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nished you in that first meeting when he made available the Staff Report to you. A. He placed most emphasis on the conclusion and he asked me if I would agree with that conclusion, that power coming from Hoover Dam could be identified as having gone into Colton. And I said what we know about electrical engineering at the present time, as we have kept up with the procession, furnishes us very definite evidence that there is no way to physically identify quantums of electrical energy.

Q. That was a conclusion you expressed to him in your first meeting with him? A. That is correct.

Q. In other words, if that day you were called into a hearing room like this and had that day been asked "Dr. Sorensen, where you have a network with multiple sources and multiple loads are you able to trace quantums of electric energy from source to points of consumption?" You would then and there have expressed yourself as you have today, in the negative, is

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that right? A. I would say it cannot be done so that you can physically identify electromagnetic impulses or quantums of energy which have been turned into a network as arriving at any particular place or coming from any particular source.

Q. Now, I am very much interested in your choice of words when you talk about identifying a quantum of electrical impulses did you say? A. I said electrical impulses.

Mr. Roos: May I pose a question to Mr. Goldberg? Are you undertaking to cross-examine Dr. Sorensen at this time?

Mr. Goldberg: No, I am only interested in understanding what he testified to exactly today so I know what to cross-examine on. The transcript isn't going to help me.

I heard what he said. But I confess to you that I need to ask these questions to find out exactly what he really said.

Mr. Bury: Certainly, I just want to indicate for the record that if he wants to continue this course of examination for the purpose of, in some brief manner, outlining the scope of matters that the doctor is purporting to cover, we think it may be useful.

Mr. Goldberg: That is exactly what I am after. Don't forget—I may have contributed to it, I was making a lot of objections, and it may not have been developed as clearly as it might have. I want to know.

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Presiding Examiner: Mr. Goldberg, I am like Mr. Roos, I have never known when clarifying questions ended and cross-examination started.

Mr. Goldberg: I am with you.

The Witness: Pardon me.

Presiding Examiner: You go right ahead.

Mr. Goldberg: I think I was in the midst of posing a question.

By Mr. Goldberg:

Q. Is this what you testified: It is your position that you can't paint kilowatt hours or put bells on them so that you can say this particular kilowatt hour moved from this point of origin to this point of consumption, is that right? A. That is correct.

Q. Now, have you testified in any other cases other than this Ohio Public Service Case? A. Not on this kind of a problem.

Q. I see.

And in these other matters that you may have testified, they were not before the Federal Power Commission? A. It was.

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Q. It was before the Federal Power Commission? A. Yes. I think it was.

Q. Do you recall the names of these other cases that you think were before the——

A. I think Mr. Miller was one of the engineers on the other side. There was an engineer by the name of Percy Thomas on the other side.

Mr. Goldberg: Was that Ohio Public Service? We are still talking about Ohio Public Service.

By Mr. Goldberg:

Q. But I did not understand you to testify, and you did not testify that if there is a problem of tracing electrical energy, that it simply is one that you cannot undertake to solve. A. I did testify that more than one line diagram could be drawn from stations tracing electrical power; and I participated and made some diagrams of that sort myself and participated with other engineers in making such diagrams. What else I testified to, I would not be able to say.

Q. All right. I wasn't trying to test your memory about what you may have said in any other cases. But today, here, I want to be sure that I understood you correctly.

Isn't it your position, if my understanding is correct, that if this tracing must be done to solve a problem, such as a jurisdictional problem which the Federal Power Commission must address itself to, that there are methods and that you have an opinion as to whether a particular method is valid or more valid than another method, is that right? A. I am not quite sure I understand what you are driving

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at.

Q. Well, let me see if I can make myself—make it more clear to you. I thought you had referred to a Vector analysis. A. I said we analyze our electrical transmission by using a Vector system of analysis.

Q. Yes.

And I had thought that when you referred to that you were indicating that there was a method of analysis that you would prefer in attempting to trace electric energy over the schematic one-line diagram method? A. If you were to ask me as a hypothetical question, let's see if I understand it: If I should take the other side and attempt to prove that some of the power from outside of California goes to Colton, I would say I cannot do it.

Q. Yes.

Suppose you had to address yourself to that problem, are you saying it is insoluble? A. Yes.

Q. So that if the Federal Power Commission has to address itself to it, it cannot address itself to it, is that your position? A. It cannot identify a quantum of electromagnetic energy as going from one place into another with any certainty.

Suppose each of these units that we call kilowatts or

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kilowatt hours were little pieces of paper with names on them, so many, so many, so many, and we threw all of them that the Edison has, representing their total energy distribution, and dump them into a pot and we start to pull out as many as represent the kilowatt hours of energy that go into Colton; the probability that one of those pieces of the big mass would fall into Colton is practically insignificant, just on a gambling chance. Now I can't say

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one never would, because that is a probability question. A fellow bets on a race and he has one chance in ten million to win and he might win, but you can't say for any certainty he is going to win. That is the situation we have in electromagnetic transmission of energy and it is one well recognized by people who have followed the program and grown up with what we have learned about the physics of electricity and its transmission.

Q. Now, have you studied the method followed by the Staff in this case? A. Not in this case because I have not understood from the Edison Company that it was my job to draw line diagrams.

In fact, if they had asked me to do so, I would have said we can do them, we can make several without any doubt; they don't mean anything.

Q. Now, referring to this Exhibit No. 2 which is the line diagram, is it your testimony in this case that this is not an accurate diagram?

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A. It may be accurate as far as it goes, but it is an incomplete diagram. It is like taking something like talking about my house and saying it represents Pasadena, and that isn't fair. You have to take the Edison System as a whole if you are going to handle this kind of a job.

Q. What it depicts here—true enough it doesn't depict the whole Edison System, but what it does depict of the Edison System, what is inaccurate? A. Well, this isn't enough. You can't prove what happens by taking a little piece of the whole.

Q. I am asking you: Looking at this little piece of the whole does it inaccurately reflect the connections, the various buses, the take-offs from the buses, the voltages

involved, the names of the circuits; is all that accurate or is it inaccurate? A. I assume it does insofar as it goes.

Q. Yes. A. Now there are some other lines coming into this area which bring power into the system and they are not shown at all.

Q. But you don't know—you haven't studied whether these other lines actually bring power into this area, what the loads are that would have to be served? A. Yes, on the other diagram I have studied the fact that other lines feed power into the Edison network and when

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those get dumped into the Edison network, the power loses its identity after it crosses a certain line. As soon as any power comes from Hoover and comes into this enclosure, part of which is drawn here, it loses its identity, it has become a part of that mass and whether you can say some of it crawls over to Colton or not is an impossibility. It may, it may not, but nobody can prove it does, nobody can prove it never does.

Now, you are attempting to prove it does and I say that can't be done in modern technical analogy and I can get any amount of support to that effect.

Q. That was your position in the Ohio Public Service Company Case, was it not? A. If I had been asked that question, I answered it that way.

Q. Are you familiar with the California Electric Company's system? A. No.

Q. Do you have sufficient familiarity—— A. I have never done any work for them.

Q. Do you have sufficient familiarity with it to say that it is a network? A. Well, I assume it is but I have never seen a diagram of the California Electric System.

Mr. Goldberg: Those are all the questions I have at this time.

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Mr. Bury: I don't know whether or not it is appropriate for me to ask one question at this time.

Presiding Examiner: It is, Mr. Bury.

Mr. Bury: Dr. Sorensen, if we assume an electric system which has all of its generation in one state and a transmission line from that system extending across the state border to another state and to a load at that point, would there be any difficulty in identifying or establishing the fact that that load in the other state was supplied wholly and entirely by energy generated in the first state?

The Witness: That gets pretty big, whether my——

Mr. Bury: Perhaps I can simplify that. I am proposing a situation where a company has all of its generating resources on one side of the state line and one customer, one load on the other side of the state line connected by a transmission line. As to that customer may you identify the energy delivered to that customer as having been generated in the first state?

The Witness: With a meter we could say it went across the line into another state. Then if you tried to pinpoint it to certain usage places in the other state and there were other systems connected over in the other state, then you could not separately identify it.

Mr. Bury: That was not my assumption, just a single point of delivery in the second state.

The Witness: Then you could identify it by meters, you

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can say this much energy goes over there, across the line, because there would be no place else for it to go.

Mr. Bury: That is all I have.

Mr. Everett: No questions at this time, Your Honor.

Presiding Examiner: Dr. Sorensen, you may be excused, sir.

Mr. Goldberg: Subject to recall.

Presiding Examiner: Yes.

(Witness temporarily excused.)

Mr. Bury: Is it understood that we might be advised first thing in the morning when you would like him back?

Mr. Goldberg: Yes.

Mr. Bury: Because we either would like to keep him here tomorrow and start with him or send him home.

Mr. Goldberg: Yes.

Presiding Examiner: Off the record.

(Discussion off the record.)

Presiding Examiner: Mr. Bury, I want the record to show at this point that after an off-the-record conference with counsel Dr. Sorensen was excused tempofarily subject to being recalled for cross-examination at a date to be determined.

Mr. Bury: Yes.

Mr. Sample, will you take the stand, please?

Earl Sample,

was called as a witness and, after being first duly sworn, was

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examined and testified as follows:

Presiding Examiner: Mr. Bury, do you wish each of these marked?

Mr. Bury: We can mark them now or I proposed to identify them during the course of his examination. Perhaps it would be convenient to identify them at this time.

I have a single sheet which bears at the bottom of it the words "Adjustable calculator elements" containing some photographs of equipment and of electric facilities. I ask that that be identified.

Presiding Examiner: It will be marked Exhibit 10 for identification.

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(The document referred to was marked Exhibit No. 10 for identification.)

Mr. Bury: I would next like identified an exhibit consisting of a cover page and seven sheets. The cover page bears the legend: "Southern California Edison Company, A. C. Network Calculator Studies of Portions of Edison, M.W.D., and U.S.B.R. Systems."

Presiding Examiner: That will be marked Exhibit No. 11 for identification.

(The document above referred to was marked Exhibit No. 11 for identification.)

Direct Examination

By Mr. Bury:

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Q. Mr. Sample, would you state your full name and address for the record? A. My name is Earl R. Sample, 4831 Grand Avenue, LaCanada, California.

Q. Mr. Sample, are you employed by Southern California Edison Company? A. Yes, I am.

Q. And what is your position with them? A. Senior Rate Engineer.

Q. Would you state your background, training and experience? A. On discharge from the Air Force in October, 1945, I entered the University of Southern California and graduated in June, 1949, with a degree of Bachelor of Engineering and a major in electrical. I started with Southern California Edison Company in June, 1949, and worked on distribution line crews in Long Beach District for nine months.

In March, 1950, I was transferred to Whittier District as an estimator to plan and prepare necessary work orders for all distribution line construction and re-builds in the cities of Whittier, Norwalk, Santa Fe Springs, Pico Rivera, and their environs.

In September, 1951, I was transferred to the General Office of the Southern California Edison Company as a Distribution Engineer and assigned to do planning of distribution circuits

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and substations for future loads, to develop new methods of construction and act as staff advisor to six of Edison's Distribution Districts.

In April 1955 I was assigned to the System Operating Division to learn the application of the new A.C. Network Calculator and was placed in charge of all distribution problems studied on the calculator.

In January 1956 I was reassigned to the Distribution Division and while serving in this capacity completed three economic studies of Distribution line conductors which brought about major revisions in line construction practices for the entire Distribution System.

In November of 1957 I was transferred to the Rate Department as Senior Rate Engineer. In that position I have made studies of geographical area zoning, and also participate in the investigation of certain phases of cost of service. In January and February of 1959 I acted as liaison with the Federal Power Commission Staff Engineers for Edison, during the field investigation made by them.

Q. Mr. Sample, what is the A.C. Network Analyzer? That is, what is its function? A. The A.C. Network Calculator or Analyzer uses the miniature replica principle to solve electric network problems. The calculator is composed of different adjustable units which can be used to represent generators, transmission or distribution

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lines, transformer banks, loads, synchronous condensers, and static capacitors.

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These units are shown on the Exhibit No. 10 for identification as passed out to you.

Q. Mr. Sample, the units with the calculator being pictured at the bottom and pictures of the types of equipment that it is supposed to represent or duplicate are shown in the upper portion? A. That is right, they are in vertical alignment.

Q. Would you continue with your description of what this network calculator does? A. Each of the calculator units may be used to represent an element of the power system. These units are connected to two flexible cords terminating on a plug panel. Representation of the electrical system to be studied can be made by connecting the units in proper configuration. Provision is made to meter real and reactive power, current, voltage and phase angle of each network element at a master metering console.

The completed study of a system will make possible the observation of the line loading to determine the adequacy or capability of the system for normal or abnormal conditions and the benefits of increased conductor sizes.

Also observed will be the bus voltage levels and the regulation to be expected. The rating of transformers, required tap range, expected transformer overloads under abnormal

conditions, desired location of new generation, desired location and terminals for new transmission facilities are among the examples of what can be concluded from the studies on the board.

Q. What does Edison generally use the calculator board for? A. Mainly for the design of future facilities, observing different system arrangements to determine the one most effective and economical.

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Q. Mr. Sample, were you requested to make studies on this board for portions of the Edison, M.W.D., and U.S.B.R. Systems? A. Yes, I was.

Q. And as a result of those studies did you prepare certain schematic drawings which illustrate the results of those studies? A. Yes, I did.

Q. Is Exhibit 11 for identification the drawings to which you refer? A. Yes, it is.

Q. Mr. Sample, I notice that in the lower righthand corner of each sheet of Exhibit 11, in the legend it contains the given date and hour. Would you indicate how the particular times, as shown on each of the sheets of this exhibit, were chosen for study? A. It takes a considerable amount of time to obtain all the information necessary to set up a study on the network

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analyzer and to then perform the study. So only a few specific times and days were chosen from the Staff engineering report to simulate the conditions as the loading changed through the years. Among those selected were the times when the maximum values were reported by the Staff for the column "Davis to Parker" for each year.

Q. Mr. Sample, you referred to the Staff Engineering Report. For the purpose that you used that term in answering that last question could not the reference be to Exhibit 3 in this proceeding? A. It is the same as Exhibit 3 where that information is.

Q. Mr. Sample, what kinds of information do you have to obtain in order to prepare the type of study you have here? A. It is necessary to obtain the resistance and reactance of each segment of the line in order to use that information in the individual line units. You also have to obtain the pumping load, which we did from M.W.D., and

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other substation loads in order to put into the individual load units the required values, and the generation on each plant to put into the individual generator units. The inductive and capacitive reactance values are obtained to indicate transformer banks and synchronous condensors.

Q. Where did you obtain that type of information? A. From the F.P.C. Staff Engineering Report, or the exhibit which is now the same as the section in Exhibit 3.

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From Edison's Hoover records, from the Los Angeles Department of Water & Power—Hoover records, from the U.S.B.R., from Edison's substation records, and from previous network study files.

Q. All of those records being records kept by those organizations in the normal operation of their business? A. Yes, they are.

Q. Beginning with the first schematic drawing, which I guess we could call Sheet 1 of Exhibit 11, what is represented on this diagram. A. In the top of the drawing are three areas noted as "S.C.E. Hoover," "M.W.D. Hoover," and "States Hoover." Starting with States Hoover, the small circle under the word "States" are the generators A-3, A-4 and N-7. This small circle represents those generators.

To the lower right of that is a larger circle which would represent the 220 kv switchrack at the States Hoover plant. To the right of that and in the upper right corner designated "B.M.P." is another large circle which is the 220 kv switchrack, Basic Magnesium Plant. Connected to that is an arrow indicating the load at that plant.

Between these large circles and small circles are lines which represent the 220 kv transmission lines.

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Between these two large circles is a small circle indicating the field tap on that 220 kv line with another line continuing

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southerly to a large circle designated "Davis." This is the 220 kv switchrack at Davis.

Connected to this point are the generators, 1, 2, 3, 4, and 5. Also connected to this point is an arrow which represents the load at Davis power plant.

Going southerly again from that large circle designated——

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Mr. Goldberg: May I interrupt a moment. That load that you said was at Davis, is that the arrow with the 228 over it?

The Witness: Excuse me. The arrow is as shown, as an arrow on here with an arrow point, and that is the load going away from Davis.

Mr. Goldberg: That is the 173?

The Witness: That is the 173 on this drawing.

Mr. Goldberg: But that 228, is that the generation?

The Witness: That is the sum of the generation of Nos. 1, 2, 3, 4 and 5 at Davis.

Mr. Goldberg: Thank you. Excuse me for the interruption. I was unclear.

The Witness: Continuing south from 220 kv switchrack at Davis is a line that goes down to another large circle which represents the 220 kv switchrack at Parker. To that is connected a line going to a form of zig-zag, which represents the two 220 kv to 161 kv transformers at that location.

Continuing from that on to the next large circle is a 161 kv line going over to the 161 kv switchrack. Con-

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nected to the large circle is a smaller circle designated as Generators 1, 2, 3 and 4, at Parker power plant.

Also connected to the large circle is an arrow which represents the Phoenix load from the Parker power plant. Phoenix and other loads from the Parker power plant, that is.

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Going back to the 220 kv switchrack at Parker, the large circle, there is a line going westerly to another large circle indicated as Gene and Intake. That is the 220 kv switchrack at Gene.

Connected to that are lines going to two rectangles which represent the loads on the Gene and Intake pumping plants.

Going westerly from the Gene and Intake switchrack is another line going to a small circle designated Camino, which connects to a line coming south from a large circle under the heading "M.W.D. Hoover." That large circle represents the 220 kv switchrack at M.W.D. Hoover, and connected to that is a line going over to a slightly smaller circle with the numbers N-5 and N-6, which represent the Generators connected to M.W.D. Hoover.

Coming back to the point marked "Camino" in the center, starting from that point, again going to the left to a large circle designated as Iron Mountain, another large circle designated as Eagle Mountain, another large circle designated as Hayfield, are the lines and 220 kv switchrack arrangements at these pumping plant locations of the 220 kv.

Connected to each of these 220 kv switchracks are small rectangles which represent the pumping plant load at those sites. Continuing westerly from the circle marked Hayfield is another line going to a circle marked Highgrove. This represents the 220 kv switchrack at Edison's Highgrove substa-

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tion. Connected to that and going through the transformer banks at that location are two arrows representing the load on those two transformer banks. There are two other lines coming into this 220 kv switchrack. One goes northerly to the upper left-hand corner to the large circle marked "Etiwanda", which represents the 220 kv switchrack at Etiwanda. To the right of that and up above that is a circle which represents the generation at this Etiwanda steam station generating plant. There is also an arrow going through the transformer bank representing the load on that transformer bank, and an arrow southerly marked "Barre", representing the load at Edison's Barre substation.

Coming back to the Highgrove, coming back to the 220 kv switchrack at Highgrove, which is represented by the large circle at Highgrove, there is another line going to a large circle marked "Chino". This is the 220 kv switchrack at Edison's Chino substation. To that is connected an arrow going to a transformer bank, indicating the load on the 220 to 66 kv transformer at Chino substation.

Mr. Goldberg: May I interrupt you there, just to make sure? That 86 that appears just above the Highgrove switchrack circle, there is, as I read it, an arrow pointing towards Chino. Does that mean the flow is towards Chino?

The Witness: Yes, it is.

Mr. Goldberg: Of 86 MW?

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The Witness: That is right.

Mr. Goldberg: Thank you.

The Witness: Also connected to this circle designated Chino are two arrows, one of which goes to Edison's Barre substation, and the other arrow on this sheet, and

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for all sheets for 1954, 1955 and 1956, is designated "Center". On the study for 1957, it is designated "Walnut".

Also connected to this circle are two lines which represent the two 220 kv circuits passing through Pisgah switching station from a large circle designated "S.C.E. Hoover", which is the 220 kv switchrack at Hoover, and connected to that is a smaller circle with the figures A-5, A-6 and A-7, which are the generators connected to the S.C.E. Hoover at that location.

By Mr. Bury:

Q. I think we missed one item, if I am correct. Attached to the circle designated Chino there is also in addition to the two arrows marked "Center" and "Barre", another arrow with a transformer symbol in the middle of its shaft. What does that represent? A. That represents the 220 to 66 kv transformer bank at Chino substation.

Q. Except for the values, numbers that appear on these sheets, and with the exception of the change of the load from Chino as being designated "Center" prior to '57 and "Walnut"

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thereafter, are the same symbols and lines appearing in each of these sheets? A. Yes, they do.

Q. And they each represent the same thing that you have described? A. They each represent the same information through the series of seven sheets.

Q. Now, looking at sheet one and its legend, the lower right-hand corner, it bears the date July 1, 1954, at 2 p.m. Why was this time selected for study? A. July 1, 1954 was the first day of the period covered by the staff engineering report, the hour 2 p.m. is indicated by the staff

report as the time of the largest value they recorded under the column entitled "Davis to Parker." In fact, this is the largest value reported by them in that column for the year 1954.

Q. Again, when you say reported in the staff report, you can simply substitute for that term Exhibit 3, can you not? A. Yes, we can.

Q. All right. What data did you obtain for the preparation of the study on sheet one? A. If you will look at the diagram, to the circle in the lower right-hand portion, at the point where the line coming south from Davis meets the line between Parker and Gene, you

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will note the value 184 immediately above the circle and 50 immediately to the left of the circle. Those values will be found on page 89 of Exhibit 3 for that date and time under the columns "Davis to Parker" and "Parker to M.W.D.", respectively.

At the extreme lower left-hand corner of the diagram appears the value of 40 at each transformer bank. These were also taken from the same place in the staff engineering report from the columns entitled Highgrove Substation Bank 1-A and 2-A.

The information that appears on the right of the sheet for B.M.P., the generation and load at Davis, the line loadings, the generation and loading at Phoenix—excuse me, at Parker, were all obtained from the U.S.B.R.

The generation figures from S.C.E. Hoover, M.W.D. Hoover, States Hoover were obtained from Edison personnel at Hoover for Edison's facilities, and from the Los Angeles Department of Water and Power for the facilities that are recorded by the Los Angeles Department of Water and Power. The pumping load, which is the rec-

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tangles on the bottom of the sheet, were obtained from the M.W.D. The rest of the figures of generation and load that appear on this sheet are taken from Edison's substation records.

Q. Now, once you have all of this information and you feed it into the machine, what do you do?

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A. With the electric system set up on the board and in balance, we are in a position to utilize the board's ability to, in effect, insert a meter at any point on that system. We then took watt-meter readings at the following points on the replica system:

You will note immediately to the right of the small circle designated Camino the figure 9.8. While physically there is no watt-meter located at that position on M.W.D.'s electric system, we were able by means of the calculator to obtain a meter reading at that location. The reading is 9.8, and it is in megawatts, as are all other values shown on these diagrams.

Immediately above Camino the value read was 88 megawatts. Values were then read immediately to the right of the Iron Mountain, Eagle Mountain and Hayfield pumping plants, and those values were 97, 86 and 59, respectively.

Immediately above the large circle designated "Highgrove" the value of 137 megawatts was read on the line from Etiwanda to Highgrove, and a value of 86 megowatts read on the line from Highgrove to Chino. You will note that each of these values so recorded are underlined by an arrow showing the direction of flow of these megawatts.

Also indicated in the extreme lower right-hand corner of the diagram is the total Edison system load at the time being studied, which was, in this case, 1699 megawatts.

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Q. Mr. Sample, I notice in looking to the large circle marked Highgrove, in the lower left-hand corner of the chart, immediately to the right of that large circle, occurs a value of 30. Is that value read from the calculator board? A. No, that value is read from a meter at Highgrove.

Q. There is a meter at the location indicated there, and that is the reading from that meter? A. Yes, it is. That was used in setting up this study.

Q. Now, with respect to the two values which appear immediately above that circle, of 137 and 86, respectively, you testified those values were read from the calculator board. Are there watt-meters at that location on the Edison system? A. No, there are not. These are read from the calculator board.

Mr. Goldberg: How about those values at Hayfield, Eagle Mountain and Iron Mountain, are those off the calculator board?

The Witness: Yes, they are.

Mr. Goldberg: Thank you.

By Mr. Bury:

Q. Turning to the second sheet of Exhibit 11, this indicates in the legend that it is a study for November 1, 1954, at 9 p.m. Why was that time selected? A. At this time the Exhibit 3, page 101, reports the lowest values shown in that report under the column "Davis to

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Parker." This is one of the few days when the value in the column "Parker to M.W.D." was greater than in the column "Davis to Parker".

Q. In that respect, then, this sheet two is different from the general criterion applied of looking for maxi-

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mum values from Davis to Parker or from Parker to M.W.D.? A. That is right.

Q. In other words, this is the extreme case the other way? A. Yes, it is.

Q. What data did you obtain for the preparation of this study? A. The values appearing on the diagram for this study were obtained from the same sources as the values appearing in the same position in the first study. You will note the large circle east of Gene in the lower right-hand portion of the diagram, the value immediately above, of 16.4 megawatts, and value immediately to the west, of 51 megawatts. These values are found on page 101 of the staff engineering report, to the degree that they were put into this machine.

Also the values for the loads of the transformer banks at Highgrove were taken from the Exhibit 3.

Q. Well, with that information supplied to the calculating board, what meter readings did you take then? A. We then took readings from Camino to Highgrove as

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follows: Immediately east of Camino, 10 megawatts; coming south to Camino, 101 megawatts; to the right of Iron Mountain, 110 megawatts; to the right of Eagle Mountain, 99 megawatts; to the right of Hayfield, 68 megawatts; coming south to Highgrove bank from Etiwanda, 103 megawatts; going from Highgrove to Chino, 66 megawatts. The total system load at this time and date was 1677 megawatts.

Q. Let's turn now to sheet three. This bears the date in the legend of July 5, 1955, at 5 p.m. You will notice also the number one immediately above the legend. Why was that time selected for study? A. This is the time for which the staff reported the highest values in the

entire test period for Parker to M.W.D. and the column designated "Davis-Parker-Camino".

Q. Where did you obtain the data necessary for this study? A. From the staff engineering report, which is the same as Exhibit 3, and from the same sources and in the same manner as for sheets one and two.

Q. Well, with that information supplied the calculator board, what meter readings did you take this time? A. We took the readings again coming into Camino of 24 megawatts from Gene; coming south from Hoover, 42 megawatts; coming into Iron Mountain of 66 megawatts; coming into Eagle Mountain of 56 megawatts; coming into Hayfield of

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27.5 megawatts, and the line coming from Etiwanda to Highgrove 124 megawatts, the line from Highgrove to Chino, 42.5 megawatts. Total Edison system load at this time was 1702 megawatts.

Q. Turning to sheet four, I notice in its legend it has, like sheet three—it bears the date and time of July 5, 1955, at 5 p.m. However, above its legend is a little designation, number-sign, 1-A.

Now, why was this study, which appears on sheet four, made? A. Sheet four shows the results of another study for July 5, 1955, at 5 p.m. This is the same time covered by the study shown on sheet three. This study, however, was prepared tying it to the data supplied from U.S.B.R. and Hoover records, rather than to the data in the staff engineering report, or Exhibit 3.

Q. Why did you do that? A. We had noticed in setting up each of these studies that the data supplied from all sources could not be balanced on the board. When we used the data reported for generation, a balance could not be reached with the values for Davis to Parker, Parker

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to M.W.D., appearing in the appendix to the staff engineering report, or Exhibit 3.

Q. Well, this failure to reach a balance, is this an unusual condition?

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A. No, it is not uncommon or surprising. The data reported are generally records of reading of indicating watt meters and a number of recorded values are being used. There are inherent errors in meters and in their reading. Of course, all readings are not taken simultaneously. It is to be expected that there will be a time lag of at least three or four minutes between the time the first and last reading of meters at these various locations.

During this time interval there are changing load conditions on these systems. All of these circumstances produce discrepancies and it is not surprising that the board could not be balanced. In all other studies we have held to those values appearing in the staff engineering report, or Exhibit No. 3, and in order to balance the system, necessary adjustments have been made in the values used for generation and load.

In this study, represented on sheet four, we held to the data supplied by U.S.B.R. and from Hoover and then with the system in balance we read from the calculator the values for Davis to Parker and Parker to M.W.D.

Q. Well, in looking at sheet four, what effect did this shift in base data have on the readings that you took on the line from Parker over to Highgrove? A. A comparison with sheet three and sheet four will show that affect (sic). For instance, the value for Parker to MWD

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changes from 66 on sheet three, to 72 on sheet four. And the value going into Camino changes from 24 on sheet

three, to 31 on sheet four. And to Iron Mountain, changing from 66 on sheet three to 68 on sheet four.

Q. Now, are the changes in values shown by that comparison in the order of six or seven megawatts, unusual or extreme? A. Not at all. However, changes in values —however, this change in values does illustrate the difficulty of reproducing or reconstructing historical conditions on an electrical system from recorded data taken from indicating wattmeters.

Q. Well, what is the accuracy of the meters in the network calculator that you used for the purpose of taking megawatt readings? A. The inherent error in the board, including the meters, is two percent or less.

Q. What else is shown by sheets three and four? A. They represent a condition of maximum deliveries, Parker to MWD; the 66 and 72 respectively. It so happens that this occurred at a time when no energy was being received by Edison. This illustrates the condition that the connected load of the MWD pumps have exceeded the Parker to M.W.D. deliveries at all times covered by the staff engineering report or Exhibit 3.

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Q. Turning to sheet five. Sheet five bears in its legend the date July 9, 1955, at 6 p.m. Why was that time selected? A. This is the time during the year of 1955 when the staff reported the highest value for the column designated "Davis to Parker".

Q. Were the values shown on sheet five obtained from the same sources and in the same manner as testified to by you with respect to the prior studies? A. Yes. Again, we held to the data in the staff report for this time which appears on page 69 of the appendix.

Q. That would appear also at page 9 of Exhibit 3? A. Of Exhibit 3.

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Q. Well, with that information supplied to the calculator board for this study, what readings did you then take? A. On the right of the circle designated Camino, the value 12.5 megawatts; on the line from Hoover to Camino, the value of 60; to the right of Iron Mountain 72; to the right of Eagle Mountain, 61.5; to the right of Hayfield, 33.5; on the line from Etiwanda to Highgrove, 144; on the line from Highgrove to Chino, 75.

The total Edison system load at this day and time was 1434 megawatts.

Q. Let's go to sheet six. Sheet six indicates a study for April 30, 1956, at 8 p.m. Why was this time selected? A. April 30, 1956, is the last day for which the staff

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reports any values for the U.S.B.R., or MWD systems. For the hour of 8 p.m., the staff reported the largest value, 192 megawatts, for the column designated "Davis to Parker", for the year 1956, and in fact, for the entire period they studied.

This is also the largest value reported that day for Parker to M.W.D., of 62 megawatts. These values are found at page 84 of the appendix to the staff engineering report or Exhibit 3.

The other values were obtained from the same sources and in the same manner as in prior studies.

Mr. Everett: Excuse me, should that be page 44 of the exhibit?

The Witness: 44.

Mr. Everett: I thought you said page 84.

The Witness: Excuse me. I meant 44.

By Mr. Bury:

Q. What values shown on sheet 6 did you read from the calculator? A. We read from the calculator the

value 8.4 on the line from Gene to Camino, read at Camino, 170 on the line from Hoover to Camino, at Camino; 175 on the line to Iron Mountain, 160 on the line to Eagle Mountain, and 122 on the line to Hayfield. Those are all readings directly at these 220 kv switchracks, so designated. The value of 80 on the line from Hayfield to Highgrove read at Highgrove; the value

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of 99 on the line from Etiwanda to Highgrove, the value of 88 on the line from Highgrove to Chino.

At this same time the total Edison system load was 2,019 megawatts.

Q. Now, on this sheet six you said you obtained some values from page 44 of Exhibit 3, which are the values 192 from Davis to Parker, and 62 Parker to M.W.D. Is this study prepared for the date immediately prior to that time in the staff report where they indicate that the so-called Gene requirements go to 67 megawatts? A. Yes, it is.

Q. Will you turn to sheet seven, please? Now, sheet seven indicates in the legend that it is for August 30, 1957, at 9 p.m. Why was that study made? A. Prior studies were periods in 1954 and 1955 and 1956, where the staff has reported U.S.B.R. and M.W.D. data. One study was selected for 1957. August 30, 1957, at 9 p.m. is the last day and hour of the year for which the staff reported any data. This was the criteria for selection. It is also when U.S.B.R. reported a substantial value at Parker on the line from Davis.

The data for this study was obtained as for the other studies, except that Parker readings were obtained directly from U.S.B.R., as they were not contained in the staff report or in Exhibit 3.

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Q. What value, as shown on sheet seven, did you read from the calculator board? A. On the line from Gene and Intake to Camino, read at Camino, is the value of 24.5 going towards Gene and Intake.

Q. That is a reversal of the direction shown on each of the prior pages? A. That is correct. On the line from Hoover to Camino, at Camino, is the value of 179 megawatts. At Iron Mountain, to the right of Iron Mountain, is 152 megawatts; to the right of Eagle Mountain, 135 megawatts; to the right of Hayfield, 86 megawatts; and on the line from Hayfield to Highgrove, read at Highgrove, is the value of 40 megawatts.

On the line from Etiwanda to Highgrove, read at Highgrove, is the value of 125 megawatts, and on the line from Highgrove to Chino, read at Highgrove, is a value of 60 megawatts.

At this same time the total Edison system load was 2262 megawatts.

Q. Mr. Sample, when were these studies shown in Exhibit 11 prepared? A. The requests to develop and prepare those studies were made around the first of November. It took several weeks to accumulate the necessary data and to set up the board. They were completed about ten days ago.

Q. That is, the studies were completed about ten days ago?

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A. The studies were completed about ten days ago.

Q. When was the preparation of the exhibit and these sheets prepared or finished? A. About five days ago.

Q. Were these studies and the Exhibit 11 prepared under your supervision and direction? A. Yes, they were.

Q. Were the various units of the A.C. network analyzer arranged and operated in a manner which correctly duplicated the portions of the U.S.B.R., M.W.D. and Edison systems being studied under the operating conditions submitted to the calculator for analysis? A. Yes. The system conditions were duplicated.

Q. How accurately? A. To the accuracy of the board, which is two per cent or less.

Mr. Bury: That is all we have from Mr. Sample.

Presiding Examiner: We will take a 15-minute recess at this time.

(Whereupon, at 2:58 p.m. a recess was taken to 3:13 p.m.)

Presiding Examiner: Do you have further questions, Mr. Bury?

Mr. Bury: We discovered that we had failed to make a correction on one of the exhibits. We would like to make it at this time, if we could.

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By Mr. Bury:

Q. Mr. Sample, would you turn to sheet one of Exhibit 11? Is there a figure appearing on that sheet which should be corrected? A. Yes. Up in the upper left-hand corner, under Etiwanda, where it shows the value of 169, this figure should be 266. The 169 is the same figure that we had recorded for S.C.E. Hoover, just to the right of it.

Mr. Goldberg: Has that change been made on the official exhibits?

Mr. Bury: No.

Mr. Goldberg: Mr. Examiner, may the reporter be directed to make that change?

Presiding Examiner: Yes. Mr. Reporter, will you make the change on the record copies?

Mr. Bury: That is all.

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Presiding Examiner: Have you any further questions?

Mr. Bury: I have no further questions of Mr. Sample. I didn't know whether or not the other parties might have clarifying questions at this time or whether they wish us to proceed with the next witness.

Presiding Examiner: Do you have clarifying questions, Mr. Goldberg?

Mr. Goldberg: I might have one or two, but I certainly would like to find out what this exhibit and testimony purports

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to show, if counsel would enlighten us.

Mr. Bury: The purpose of the studies were to take some meter readings at different locations on this system, at points where meters do not exist. I am quite sure that the staff engineers who made their field investigation appreciated that problem at that time, that there was, in effect, a lack of metering which made this problem somewhat more difficult.

Really, we think that these exhibits will perhaps bring the factual issues in this case to a head, and perhaps make them somewhat narrower. I think they will demonstrate several things. I think they will demonstrate, first of all, the general inaccuracy in making power flow studies, that is, reconstructing, trying to reconstruct past conditions, even with an analyzer of this type, which is, I guess, the best known way to do it.

I think it further proves that the M.W.D. pump load has, at all times covered by the staff report, exceeded any Parker to M.W.D. delivery, and that even if you adopted Mr. Miller's theory of this problem, even assuming that that were correct, which we do not, that any such deliveries were so minute and so infrequent as to be accidental or

negligible and should be disregarded; and in any event, they have long since ceased.

I think they help establish one thing, of course, which we have stipulated, which is that the energy generated at Hoover does reach Highgrove substation. So we don't have to argue

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about that.

Mr. Goldberg: I thought you were confirming that in it, and I was a little bit surprised that you undertook to prove up the staff's case, and that is really why I asked you for a statement of purpose.

Mr. Bury: Put it this way: I do think the study confirms many of the facts about which the staff testified. As a matter of fact, some of those same facts we will put on through Mr. Montgomery. But I think they are helpful in letting us really narrow the issues in this case, by getting some figures in the record by which we can both work. That is really the purpose of it.

Mr. Goldberg: I thank you very much for that statement, Mr. Bury. I think it is helpful. We do want to reserve full cross-examination, but we do have one or two questions.

Cross-Examination

By Mr. Goldberg:

Q. Where is the Colton load on this diagram? A. The Colton load——

Q. The City of Colton load. A. The City of Colton load would be a portion of the Highgrove 220 to 66 kv transformation load.

Q. Either one? Looking at sheet one of 7, for example, of Exhibit 11, either one of those arrows at the extreme left, taking off from the Highgrove switchrack.

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A. These transformer banks are in parallel.

Q. I see. So the City of Colton load is served off those lines radiating from the Highgrove switchrack that bear the designation "Highgrove 220, Line 66 kv transformer"; is that right? A. I believe so.

Q. Those two lines that show the 40 M.W. values on sheet one; is that right? A. I believe so.

Q. Now, you didn't set up your calculator to go beyond Highgrove all the way down to Colton, did you? A. No, I did not.

Q. But your calculator is capable of doing that, isn't it? A. Yes, it is, through separate studies.

Q. What is that? A. Through separate studies.

Mr. Goldberg: Thank you very much. That is all we have at the moment.

Presiding Examiner: Staff?

Mr. Everett: Mr. Examiner, staff at this time renews its request that it be permitted to cross-examine at the completion of the direct testimony.

Presiding Examiner: Do you have any clarifying questions you want to ask?

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Mr. Everett: No.

Mr. Roos: The California Commission asks it be permitted to reserve its cross-examination.

Mr. Bury: In light of Mr. Goldberg's question, maybe I have one that will clarify things for him, just one.

Mr. Sample, is there any way that this A.C. network calculator can be arranged or operated so as to identify the loads shown here as the Highgrove 220 to 66 kv banks, as being supplied either from S.C.E. Hoover, M.W.D. Hoover, Davis, or any other generation shown there?

The Witness: No.

Mr. Bury: That is not a function of the board?

The Witness: That is not a function of the board, it can not do that.

Presiding Examiner: Thank you, Mr. Sample. You will be excused until you are called further for cross-examination.

Mr. Bury: Mr. Montgomery.

(Witness excused.)

WILLIAM E. MONTGOMERY

was called as a witness, being first duly sworn, and testified as follows:

Direct Examination

By Mr. Bury:

Q. Mr. Montgomery, will you state your name and address for the record, please?

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A. William E. Montgomery, 106 Santa Cruz Road, Arcadia, California.

Q. Are you employed by Southern California Edison Company? A. I am.

Q. What is your position with that company? A. Vice President in charge of Operations.

Q. How long have you held that position? A. I was elected vice president last April. Previous to that I had the same area of responsibility as general manager of operations.

Q. Would you briefly outline your background, training and experience? A. I started my career with the Southern California Edison Company in 1926, as an apprentice operator in substations division of the Operating Department. I worked in various substations as an operator, was later made station chief, still in the substation

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division; then was reassigned to the system dispatcher's office in about 1936, where I served as a shift dispatcher for approximately two years.

Towards the end of that service I was appointed acting assistant chief dispatcher. Then I was transferred to the general office as relay protection engineer. Subsequently I was appointed system operator, in which position I had the responsibility of training and instructing our sys-

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tem dispatchers and our switching center operators and the operators in our hydro and steamplants in the elements and the fundamentals of system operation.

In 1942, I went out to the basic magnesium project at Las Vegas, Nevada, and I had charge there of the electrical operation of that project system.

I served in the United States Navy during the latter part of the war, aboard a repair ship. I returned to the Edison Company early in 1946, and became, shortly thereafter, assistant operating engineer in the Operating Department; subsequently operating engineer, general superintendent of system operations.

In 1954 I was appointed manager of the Operating Department and subsequently general manager of operations, my present assignment.

Q. Mr. Montgomery, I take it from a review of that background, that you are rather intimately familiar with all of the properties, operating properties, of Edison and the manner in which they are operated? A. That is correct.

Mr. Bury: Excuse me. We have some maps we would like to distribute.

Mr. Examiner, we would like to have identified as an exhibit a rather large map, which bears the legend "Electric power systems of California and their interconnections,

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Southern California Edison Company," bearing a number in the lower right-hand corner of No. 9108.

May we have that identified?

Presiding Examiner: That will be marked Exhibit 12 for identification.

(The document above referred to was identified as Exhibit No. 12.)

Mr. Bury: Because these maps are rather large, we are going to place one on the board here, which I think would be generally visible to everyone. I am handing two copies to the reporter. We have other copies available for the parties, although we haven't undertaken to distribute them, because we were afraid it would cover all the table space.

By Mr. Bury:

Q. Mr. Montgomery, I direct your attention to Exhibit 12 for identification, the map entitled "Electric Power Systems of California", and ask you if that is an accurate geographical representation of the electric power facilities of Edison which are shown thereon? A. It is.

Q. As to the correctness of the geographical representation of the facilities of other companies on that map, do you believe them to be correct? A. As far as I know, they are correct.

Q. Mr. Montgomery, would you give us a brief general

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description of the electric system of Southern California Edison Company? A. The Edison Company system serves over a million and a half customers, located in ten counties in south-central and southern California. We have a service area of approximately 20,000 square miles. The production resources, supplying the electrical de-

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mands of this system, consist of 37 generating plants and 90 generating units.

The major generating sources consist of 540,000 kilowatts of generation on the Big Creek project, located about sixty miles northeast of Fresno in the high Sierras, as I am indicating on the exhibit map here with the pointer.

There are a total of ten steam plants presently in service on the system with a combined capacity of 2,876,000 kilowatts. Now, these steam plants are located generally along the coast, with one exception. Mandalay is the most northerly of the plants. It is located between Oxnard and Ventura. The next plant south is at El Segundo, still along the coast, and just south of that, El Segundo is within the city of El Segundo, and just south of that, still along the coast, is Redondo steam plants Nos. 1 and 2, located in the City of Redondd Beach, California; and still further south is the location of three plants designated as Long Beach No. 1, No. 2, and No. 3, located on Terminal Island in the City of Long Beach, California.

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Also in that same vicinity is Alameda steam plant, located between Long Beach and Seal Beach. Then further south is Huntington Beach steam plant, along the coast.

One exception is a steam plant that is inland, Etiwanda, which is near Fontana, at this general location here (indicating).

Now, in addition to our Big Creek project and the ten steam plants which I have indicated, we also have a source of generation at Hoover Power Plant on the Colorado River, near Boulder City. The effective capacity currently available to Edison from that source is about 310,000 kilowatts.

In addition to these several major generating sources that I have enumerated, we have a total of 97,000 kilowatts in 18 smaller hydro plants. These smaller hydro plants are stream flow plants, generally, and the total capacity of the 18 plants is approximately 97,000 kilowatts. These plants are located on several rivers and streams in south-central and southern California.

There are three plants on the Kaweah River, one on the Tule River, and three plants on the Kern River, and the balance of the several small hydro plants are located in the general southeastern section of the system, between Upland and Redlands, generally.

Q. Is that area shown on the insert in the lower left-hand corner of Exhibit 12?

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A. Yes, it is. These major generating sources, at Big Creek here in the north, and the steam plants along the coast and inland at Etiwanda, and the Hoover hydro plant, are all interconnected by 220 KV transmission system. That is represented here by the heavier dark lines, coming almost directly south from Big Creek, down through switching station at Magunden and tying in with the load center of the system in the general vicinity of Mesa Substation, and then being connected also from Hoover by means of two direct lines from the Hoover power plant to Chino substation, going in the southwesterly direction from Hoover, generally, and a third connection with Hoover generating source through the Metropolitan Water District system to Hayfield, where Edison interconnects with a line that we own and operate from Hayfield through Highgrove and connecting with the main system at Highgrove.

Now, at various locations along this main transmission system, this 220 kv backbone, we have a number of trans-

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mission substations connected. There are a total of 20 of these stations, wherein the transformation of voltage is made from 220 thousand volts to 66 thousand volts, and bulk power is supplied through these transmission substations to the areas which they serve at 66,000 volts.

The combined capacity of this 220 to 66 kv transformation is in excess of four million kva.

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Each of these bulk power transmission substations supplies power through a 66 kv sub-transmission system to several distribution substations.

Our transmission system, the 220 kv backbone, consisting of over 2,000 circuit miles, and the 66 kv sub-transmission system of over 3,000 circuit miles, constitute the main transmission sources of this production resource to the load.

Q. Mr. Montgomery, I would like to call your attention to a system single-line diagram which appears in the power system statement form 12, filed by Southern California Edison Company, and I believe identified as Item "A"; this is, as I said, attached to the report for the year 1957.

To the best of your knowledge, is that diagram a correct and true representation schematically of the facilities shown thereon? A. To the best of my information and knowledge, it was correct as of the date recorded in the lower right-hand corner. It is not true as of today.

Q. I want to direct your attention now to the same type of single-line system diagram appearing in Edison's form 12 power system statement for the year 1958. This bears the notation in the lower right-hand corner No. 71036-5. I ask you again if that is a correct diagrammatic representation of the facilities shown thereon. A. It is, as far as I know, again, as of the date of

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the revision shown in the right-hand corner.

Q. What was the date of that revision? A. 1-58, I believe it is.

Q. Did you say that shows a revision date of 1-1—is it '59? A. I beg your pardon, 1-1-59.

Q. Thank you.

Mr. Bury: Could we have this diagram identified as an item for incorporation by reference?

Presiding Examiner: It will be marked Item "H" for identification.

(The material above referred to was identified as Item "H" by reference.)

Mr. Cragun: May we have the number of that again, please?

Mr. Bury: I might make this comment at this point to help tie them together. I believe Item "A" bears Drawing No. 71036-3.

Mr. Cragun: That is true.

Mr. Bury: What has now been identified as Item "H" bears No. 71036-5.

Mr. Goldberg: And this is part of the 1958——

Mr. Bury: 1958 Form 12 power system statement of Southern California Edison Company.

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By Mr. Bury:

Q. Mr. Montgomery, would you explain what the system single-line drawing identified as Item "H" shows? A. The system single-line diagram identified as Item "H" shows all of the generating stations that I have discussed, with one exception. I think Mandalay Steam Station is not shown as completed on this drawing. Otherwise, I believe, it shows all of the generating stations that

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I have previously discussed. It shows the 220 kv electrical transmission system interconnecting these major generating sources, as outlined in the heavy black lines. It also shows the 20 transmission substations that are connected to this 220 kv backbone and supply bulk power therefrom to the 66 kv subtransmission system. It shows the 66 kv subtransmission system in the lighter solid lines, and the distribution substations connected thereto in the form of symbols representing buses and circuit breakers and transformer banks. It also shows certain lower voltage portions of the electrical system below 66 kv as necessary to indicate the connections of some of these smaller hydro plants that I mentioned that are part of the generating resource of the system.

And, finally, in addition it shows interconnections between the Edison System and adjacent utility systems.

This diagram obviously is not laid out on a geographic basis. The Big Creek plants are generally over here on the

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lefthand side of the drawing. The Hoover source is up in the upper righthand corner and the steam plants, with the exception of Etiwanda, are along the lower margin; Etiwanda is up near the top margin on the righthand side of the drawing.

The distribution system is not shown at all on this diagram with the exception of a few locations where it is shown to tie in the small stream flow hydro plants with the system. Otherwise it is not shown at all. The distribution substations connected to the subtransmission system are only shown insofar as the transformer symbols, stepping down from 66 kv to distribution voltage of 16,000, 12,000, 7,000 or 4,000 volts as the case may be. And generally none of that Distribution System is shown on this system diagram.

Q. Mr. Montgomery, would you describe Edison's distribution system and its manner of operation? A. Well, as I have already indicated, the Edison distribution system begins with these several distribution substations shown on this diagram in the lighter solid lines, and includes, in addition to those substations shown here, the distribution bus at those stations, and the distribution network of circuits, feeder circuits, emanating from that distribution voltage bus at 16,000 or 12,000 or 7,000 or 4,000 volts, as the case may be. These distribution circuits making up this feeder network generally traverse the streets and the alleys and the property lines and serve the customers' premises with

electric energy.

Mr. Goldberg: Would that be 16, 12, 7 and 4 you were referring to?

The Witness: 16,000 volts, 12,000 volts, 7,000 volts and 4,000 volts.

Mr. Goldberg: Those are the voltages that are involved in traversing the streets and alleys to serve the customers?

The Witness: That is correct.

Mr. Goldberg: You are talking about Southern California Edison's ultimate customers?

The Witness: I am talking about the customers that we serve including this 1,500,000-plus that I mentioned at the outset.

Mr. Goldberg: I am afraid I missed that one million five at the outset. What was that a reference to?

The Witness: That is the number of customers that the Edison System serves in total, over 1,500,000.

Mr. Goldberg: I see. Thank you very much.

Mr. Bury: Mr. Examiner, I would like to have identified as an exhibit a map bearing the title "Southern Cali-

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fornia Edison Company, San Bernardino and Redlands Districts."

Presiding Examiner: That will be marked Exhibit 13 for identification.

(The document above referred to was marked Exhibit No. 13 for identification.)

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By Mr. Bury:

Q. Mr. Montgomery, would you explain what is shown by the map identified as Exhibit 13? A. May I step down, sir?

Presiding Examiner: Yes, certainly.

The Witness: This map, Exhibit 13, shows the Edison Distribution System in San Bernardino and Redlands Districts. The black lines on the map are the distribution feeders along the streets and alleys and property lines and so forth serving the customers in these two districts. The red lines on the map indicate 220 kv transmission circuits that traverse this geographical area, and the green lines represent the location of 66 kv subtransmission lines within the area. It also shows the distribution substations that I have previously referred to in these two districts.

The Colton substation, for instance, is at the junction of the green lines just above the red line in the area of the map above the title. Highgrove substation is just below that at the junction of the green and the red lines. And farther up and slightly to the right is Cardiff substation, a junction of another pair of green lines.

Over the lefthand side is Declez substation at the junction of green lines, Etiwanda steam plant is shown still further to the left at the junction of the red and the green line.

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By Mr. Bury:

Q. You have mentioned from time to time the Colton substation of Southern California Edison Company. Can you identify that? A. Well, Colton substation of the Edison Company is one of these distribution substations that I have already discussed. It is fed from the sub-transmission system out of Highgrove substation. It steps down the voltage from 66,000 volts to approximately 12,000 volts and feeds several 12 kv or 12,000-volt feeder circuits in this area that is shown in the shaded portion of this map.

Included in these several distribution circuits of 12,000 volts emanating from Colton substation are two that feed the City of Colton, the Globe Mills and the Derby 12,000-volt circuits. On this map Colton City sub is indicated here in the black line, the black small square just above and slightly to the left of the Colton substation, the Colton distribution substation.

Q. Mr. Montgomery, by referring to Exhibits 12 and 13 for identification could you describe the method by which Edison's Colton substation has been supplied historically from the sub-transmission system? A. Well, going back to the early 1900's the 10,000 volt system that then existed at Colton substation was supplied from—that carries the local distribution system—was supplied

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from 33,000 volt transmission which interconnected in the early 1900's, some of these early ventures in hydro-electric generating plants that are still in operation and are included in some of these smaller hydro plants that I mentioned as part of the Edison generating resources.

In about 1912 the 66,000 volt transmission system was extended into what is now the Colton substation and the

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transformation from 66,000 volts to 12,000 volts was installed and from that time until approximately 1928 the 66,000 volt transmission system was carried from various generating sources and from the 220 to 66 kv transformer stations that then existed, then only one at Eagle Rock. This was supplemented later by the Laguna Bell substation.

All of this 66,000 volt system operated in parallel at that time and was fed, as I have indicated, from the generating plants and 220 to 66 kv stepdown substations that then existed.

Then, as the system continued to grow it was necessary to expand both generation and transmission facilities and with the advent of Lighthipe substation and subsequent thereto, about 1928, the sub-transmission system was split up and the Colton Distribution Substation was carried from Lighthipe. Now, Lighthipe is located in North Long Beach. The size of the system was such in those days, around 1928, that all of this load going clear out here to the east end was carried either

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from Laguna Bell substation, near the town of Bell, or from Lighthipe substation in North Long Beach.

Subsequently, as we continued to add facilities to meet new load growth, additional 220 to 66 kv substations were constructed. The next one, I believe, was Chino. The Colton distribution substation source was transferred to Chino substation, to the Chino 220,000 to 66,000 volt source.

And still later, after 1946, with the completion of Highgrove substation and following the cut-over to 60 cycles of our system, the Colton distribution substation was transferred to Highgrove 220,000 to 66,000 volt source, where it exists today, still connected there.

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Q. You described the various changes which have occurred and the manner in which Colton distribution substation has been supplied. How long has the Colton substation continuously served the same general area shown by the color on Exhibit 13 for identification? A. It has served the same general area since the early 1900's, and as I indicated, at 12,000 volts since 1912.

Q. Mr. Montgomery, for the purpose of operation of the Edison System how do you distinguish between transmission and distribution facilities? A. Well, the 220,000 volt lines and the substations and the 66,000 volt lines constituting this network that I have described of subtransmission facilities constitute the

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transmission system. The 66 kv stepdown substations and the 16,000 and 12,000 and the 7,000 and the 4,000 volt feeder circuits, together, constitute the distribution system.

Colton substation, for example, is a distribution substation. And the 12,000 volt circuits emanating from the Colton 12,000 volt bus are local distribution feeders.

Q. At what particular——

Mr. Goldberg: Just a minute. Let me have that last part about the feeders. I didn't hear that.

Presiding Examiner: Would you read the answer, please.

(Answer read.)

By Mr. Bury:

Q. Just to be a bit more specific, if I may, can you designate a point on the portion of the Edison System within that colored area where transmission ends and local distribution begins?

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Mr. Goldberg: Let me just ask this question. I notice you use "local distribution." Do you use that in any legal sense? I mean how are you using it in your question?

Mr. Bury: I am not sure that the term needs definition. I think it is a term in common usage in the electric business. This is the man who knows plenty about the electric business and I think you can ask him if he can——

Mr. Goldberg: This is your question. What I want to know, Mr. Examiner, is whether this question is being used in the

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terminology of the Federal Power Act.

Mr. Bury: I suppose we will find that out after this case has gone through the courts. All I am asking this witness is if he can tell we whether or not he can identify a point on the portion of the Edison System shown in the colored area on Exhibit 13 where transmission ends and local distribution begins. Now I am quite sure that he understands the question. If he does not, he can so reply.

Mr. Roos: I think the difficulty can be resolved, Mr. Examiner, if the witness would perhaps define what he means by "local distribution facilities."

Mr. Goldberg: All right, that is all right.

The Witness: What is the question now——

Mr. Bury: If you would excuse me, I think these are still comments on the pending question.

Presiding Examiner: That is true.

Mr. Bury: If that is the case I would like to state that I believe that the witness in his previous testimony has given sufficient information to define those terms. If not, you can ask him on cross-examination.

Mr. Goldberg: I don't agree at all. I think that the witness—it would be agreeable to us if in answering that question, since counsel seems reluctant to define his use of the term, that the witness give us his answer along with how he uses the term, the definition.

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Presiding Examiner: Let's see how the witness answers the question and then you make your objection.

Mr. Goldberg: All right.

Mr. Bury: We do have, then, my same question pending.

Presiding Examiner: Yes.

Do you remember the question?

The Witness: May I have the question now?

Presiding Examiner: Will you read the question to him, Mr. Reporter?

(Question read.)

The Witness: Yes, I can.

By Mr. Bury:

Q. Will you do so, please? A. The 66,000 volt buses at Colton substation.

Mr. Goldberg: Now, may we have your definition of local distribution? Otherwise I am going to move to strike that answer because it raises the very problem—you asked a completely blind question; maybe you and the witness know how you are using those words, but we don't. It so happens that those words that you use—maybe it is by mere inadvertence—have a special meaning under Part II of the Federal Power Act. Now if you are going to get facts out of this witness, fine, but if you are trying for legal conclusions I am going to object to it.

Mr. Bury: I would certainly think that the question of

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what on the Edison System constitutes transmission and what constitutes local distribution is a matter of fact, a matter of opinion for a man with Mr. Montgomery's qualifications to answer it.

Mr. Goldberg: Then you shouldn't have any trouble telling us how he uses those terms. What does it mean to him?

Mr. Bury: Mr. Goldberg, I am sure you have a perfect right to cross-examine this man as to what those terms mean to him.

Mr. Goldberg: I am entitled to know when you ask your question.

I move to strike the question and the answer. First we were told that the witness might supply us with the information, now we don't have it, and there is an objection to my getting it from the witness.

Mr. Bury: Perhaps we can do this, in the interest of saving time.

By Mr. Bury:

Q. Mr. Montgomery, if I were to rephrase——

Mr. Goldberg: Are you withdrawing that question and the answer?

Mr. Bury: I need the question and the answer in the record for the purpose of reference at this point, as I think you will understand, and I will ask him this so that I do not have to repeat.

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By Mr. Bury:

Q. Mr. Montgomery, if I asked you the same question only in this form: Can you indicate a point on that portion of the Edison System shown by the colored area on Exhibit 13 for identification where transmission ends and

local distribution begins, as you understand those terms, would you give the same answer? A. Yes, sure.

Mr. Goldberg: Now, how does he understand those terms? We are right back to that problem.

He is keeping it within his own bosom and I want the record to show it so that I know how to cross-examine him.

Mr. Bury: I think—I will ask the Examiner to rule on the objection.

Mr. Goldberg: I move to strike the question and the answer, Mr. Examiner. We are faced by a problem here where there are particular words used in Part II of the Federal Power Act. I don't know whether it is mere happenstance or not that counsel selects that particular phrasing to ask his question, but I do know that counsel could very well argue in his brief that the witness testified that these are facilities within the meaning of Part II of the Act as they are used.

Mr. Bury: I certainly intend to.

Mr. Goldberg: I know darn well you intend to.

Presiding Examiner: Do you wish to be heard, Mr. Everett?

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Mr. Everett: Staff just simply wants to point out to the Examiner that these words, such as "local distribution," are in a sense words of art and while they may be both engineering terms as well as legal terms, it is important, in view of the fact that they are legal terms and that they are used in this particular statute involved in this proceeding, that the witness should at this time specify what he means by those words and phrases that he is using, that is the words and phrases which are found in the statute.

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Mr. Bury: Perhaps I can cure this by one more question. I will try and see if it helps, if you have no objection.

By Mr. Bury:

Q. Mr. Montgomery, in answering the questions which I previously put to you did you use the terms "transmission" and "local distribution" in the sense that those terms have in the operation of electric distribution systems? A. I did.

Mr. Goldberg: Well now, can't—we keep coming up to it but we never get into it. I don't know why. Let's have an understanding from this witness as to his use of those terms.

By Mr. Bury:

Q. Mr. Montgomery, I asked you previously some questions which contained the words "transmission" and "local distribution" and you answered those questions. What is your understanding of those terms?

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A. Well, "transmission" means in the operation of an electrical system including the Southern California Edison Company, the transmission of bulk power.

"Distribution" means the distribution of electrical energy to the local community.

Presiding Examiner: Mr. Montgomery, do you mean by that wholesale sales for resale or do you mean retail sales for ultimate consumption?

The Witness: I mean both. I don't think there is a difference.

By Mr. Bury:

Q. Mr. Montgomery, in the questions and answers which have just preceded, am I correct that you have said

that the facilities shown on Exhibit 13 beyond the 66 kv bus at Colton substation—that would be the transformer banks, the 11 kv bus and the distribution circuits going out from there, including those circuits which run to City of Colton substation, and the transformation facilities there—are local distribution facilities as you just defined that term? A. That is what I mean.

Q. Mr. Montgomery, I show you a copy of Exhibit 1. Now, for the purpose of this question I want you to assume for the time being that all of the electric facilities shown on Exhibit 1, excepting only Colton substation and the Derby and Globe Mills Distribution Lines, simply did not exist. Under that

assumption could Edison, by means of the other portions of its existing system, as shown on Exhibit 13, but which are not shown on Exhibit 1, serve all of the electric requirements of the City of Colton?

Mr. Goldberg: Let me have that question, please.

Presiding Examiner: Will you read the question, Mr. Reporter?

(Question read.)

Mr. Goldberg: I object to that, Mr. Examiner. It has absolutely no bearing on any issue in the case, what they might otherwise do. We are concerned in this proceeding with what is the fact and what they do do. If in fact they use interstate energy to sell at wholesale to Colton, that is the basis upon which this case is to be determined.

Mr. Bury: Perhaps counsel does not perceive the purpose for which that question was asked.

Mr. Goldberg: Perhaps I don't.

Mr. Bury: The question was asked for the purpose of putting Exhibit 1 in proper perspective, and also to show,

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I think, to some extent, the fallacy of the method of analysis used by the Staff in tracing power flows.

Mr. Goldberg: I certainly don't see how that follows from the question or any answer that may be made to it.

Presiding Examiner: Mr. Everett?

Mr. Everett: Mr. Examiner, Exhibit No. 1 was not introduced

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by the Staff in connection with its testimony on power flow.

Mr. Bury: I did not say it was.

Presiding Examiner: The objection is sustained.

Mr. Bury: Mr. Examiner, while I haven't completed Mr. Montgomery's testimony we are going to change subject matter and I thought this might be an appropriate time to offer into evidence Items A, B, and H, and Exhibits 12 and 13. Do you recall what those items are?

Items A and H are the single-line diagrams and Item B was the switching diagram which Mr. Miller indicated he referred to in preparing Exhibit 2.

Presiding Examiner: Items A, B and H will be received in evidence at this time.

(Items A, B and H for identification were received in evidence, by reference.)

Mr. Bury: I also offer at this time Exhibits 12 and 13.

Presiding Examiner: You are not offering 10 and 11 at this time? Those are Mr. Sample's exhibits?

Mr. Bury: To be very frank I thought that we might—there might be some argument over an offer on those exhibits and we might reserve ruling on them. Of course I have no objection to them being received.

Presiding Examiner: I am not suggesting that you——

Mr. Bury: Let's try. I will offer Exhibits 10, 11, 12 and 13 into evidence at this time.

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Mr. Goldberg: Ten was a——

Mr. Bury: Ten was a single sheet.

Mr. Goldberg: Those are the picture.

Subject to cross-examination I have no objection.

Presiding Examiner: Hearing no objections, Exhibits 10, 11, 12 and 13 will be admitted in evidence at this time.

(The documents heretofore marked Exhibits 10, 11, 12 and 13 for identification were received in evidence.)

Presiding Examiner: Now, since you are going to another subject and you may not get it completed this afternoon, and since we will be on tomorrow, suppose we adjourn now until 10 in the morning.

Mr. Bury: That is fine.

Mr. Goldberg: Here again?

Presiding Examiner: Yes, in this room at 10 o'clock in the morning.

(Whereupon, at 4:24 o'clock p.m., the hearing was adjourned, to reconvene at 10:00 o'clock a.m., Thursday, December 10, 1959.)

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THURSDAY, DECEMBER 10, 1959.

The above-entitled matter came on for hearing, pursuant to adjournment, at 10:00 a.m.

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PROCEEDINGS

Presiding Examiner: The hearing will come to order, please.

Are there any preliminary matters? If not, are you ready, Mr. Bury?

Mr. Bury: We are.

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Whereupon,

WILLIAM E. MONTGOMERY

resumed the stand and testified further as follows:

Direct Examination (Resumed)

By Mr. Bury:

Q. Mr. Montgomery, at the end of the day, yesterday, we were describing some of the distribution facilities of Edison which are shown on Exhibit 13. I direct your attention now to a diagram entitled "Colton Switching Center" which is Item "B" by reference, and I will ask you if Item "B" by reference shows in schematic form a portion of the facilities which are represented geographically on Exhibit 13 for identification? A. That is correct, it does.

Q. Yesterday morning were you present when Mr. Sack testified about a proposed change in facilities for service to the City of Colton? A. Yes, I was.

Q. Would you describe the nature of that change,

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insofar as it affects facilities of the Edison Company? A. Well, this is simply a physical relocation of the Colton City substation. The new substation is some short distance from the present Colton City substation. It will be served by the same two distribution feeders, Globe Mills and Derby, as now serves the present Colton City substation, and within the new station there is a change in metering point from the 4 kv side of the transformers in the present substation to the 12 kv side in the new facility.

Q. Mr. Montgomery, will you give us a brief description of the facilities located at Hoover Power Plant? A. The Hoover Power Plant consists essentially of a dam and a reservoir, the power house and certain appurtenant works and various transmission terminal switching facili-

ties. There are presently installed in the power house a total of sixteen main generators, nine of which are located on the Arizona wing of the power house, on the Arizona side of the river, and seven in the Nevada wing. Two of these main generators have a nominal capacity of 40,000 and 50,000 kilowatts respectively, and the balance of the main generators have a nominal capacity of 82,500 kilowatts each.

Q. Mr. Montgomery, does Edison purchase energy from Hoover Power Plant? A. Yes. Edison has a contract for electric energy with the United States dated May 29, 1941.

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Mr. Goldberg: Was that May 29, 1941?

The Witness: That is correct.

Mr. Goldberg: You said that was a contract between Edison and the United States?

The Witness: That is right.

Mr. Bury: Mr. Examiner, I would like to have identified at this time a volume entitled "Southern California Edison Company Limited, a Corporation, Exhibit I, Colorado River Contracts."

Presiding Examiner: It will be marked Exhibit No. 14 for identification.

(The document above referred to was marked Exhibit No. 14 for identification.)

By Mr. Bury:

Q. Mr. Montgomery, I will show you a copy of Exhibit 14 for identification and ask you if the contract between Edison and the United States to which you referred is that contract which appears on pages 1 through 73 of that exhibit? A. That is correct.

Mr. Everett: Excuse me, Mr. Bury. Do you have a copy of that?

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Mr. Bury: Yes. I believe copies of this were mailed by us to all parties some weeks ago. Is there anyone here who does not have a copy who needs one?

(No response.)

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By Mr. Bury:

Q. Mr. Montgomery, would you just very briefly summarize the contents of that contract for the sale of electric energy between Edison and the United States?

Mr. Goldberg: Before the witness does that would you mind stating the relevance of this testimony with respect to this contract?

Mr. Bury: Yes, certainly.

It is relevant in several respects. Initially, of course, we have had testimony as a part of Colton's case containing statements that Edison purchases or obtains, in some manner, energy from the Hoover Project. We, of course, believe that the contracts are the best evidence of that relationship and therefore wish them in this record.

Secondly, as we have outlined in our motion to dismiss and as a part of our opening statement, we believe that this particular sale is not subject to the jurisdiction of the Federal Power Commission, for one particular reason, in that Edison obtains its energy from the Hoover Project under contracts entered into with the United States pursuant to the terms of the Boulder Canyon Project Act, which Act we believe precludes Federal Power Commission jurisdiction where the energy originates at that particular project.

For the Examiner's assistance at this time, if you wish us to make reference to that particular provision of the

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Boulder Canyon Project Act on which we rely, it may be found in this volume of the Federal Power Act, published by the Commission——

Mr. Goldberg: You are referring to the pamphlet copy of the Act?

Mr. Bury: Yes, the pamphlet copy published by the Commission.

In "Appendix," which is a compilation of statutes related to the Federal Power Act and the jurisdiction of the Commission. And in that Appendix at page 57 will be found Section 6 of the Boulder Canyon Project Act on which we rely.

Mr. Everett: Mr. Examiner, may the staff be heard on this matter?

Presiding Examiner: Excuse me.

Mr. Everett: Have you finished, Mr. Bury?

Mr. Bury: Pardon me. I had completed my statement of the reasons why I believe this and the other contracts which will follow are relevant and material to this proceeding.

Mr. Everett: May the Staff be heard on this question?

Presiding Examiner: Yes.

Mr. Everett: Mr. Examiner, we believe that the record will show that as to the interstate energy which the Staff believes is involved in this wholesale electric service by Edison Company to the City, comes to the City through the Hayfield connection, and that as to that energy it has not been shown

that Edison generated that energy at Hoover. Rather Edison obtained that energy at Hayfield from Metropolitan Water District of Southern California.

So insofar as the purpose for offering these contracts in evidence is to show the method of Edison's operations at Hoover, we believe that these contracts are not relevant because the Staff's presentation regarding the interstate

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flow of energy did not relate to the energy generated at Hoover by Edison, rather it related to energy that Edison purchased as we just said, at Hayfield, from M.W.D.

Now, Mr. Bury also indicated that another purpose for offering these contracts in evidence was to show, as I understood him to say, that Edison Company was exempt from Federal Power Commission jurisdiction. As Mr. Bury pointed out, these contracts were entered into pursuant to the Boulder Canyon Project Act as amended by the Boulder Canyon Project Adjustment Act, and it is the Staff's position that these contracts do not deprive the Federal Power Commission of jurisdiction which the Commission would otherwise have under the Federal Power Act over Edison's wholesale sale to Colton, and therefore the contracts are not relevant here.

Mr. Bury: I may make a very short reply to us (sic) Mr. Goldberg, do you wish to speak first?

Mr. Goldberg: Yes. Then you can address yourself to both of us.

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Mr. Bury states that one of the purposes of identifying this contract and asking the witness to summarize its provisions, which question is somewhat inconsistent with the statement of the counsel that the contract is the best evidence—he states that this is offered in connection with the question of purchase of energy generated at Hoover. I think he said that Colton's case indicated that the energy was purchased at the Hoover Project.

Now, I haven't understood, with respect to that purpose, that with respect to energy generated at Hoover, which is transmitted over the facilities by way of Chino, owned and operated from Hoover by Southern California Edison, that Southern California Edison contends that they do not purchase that energy at Hoover from the United States.

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Now, if I am mistaken in that I would like to be enlightened.

Mr. Bury: I don't understand your statement.

Mr. Goldberg: Does Southern California Edison contend that it does not purchase energy generated at Hoover from the United States, and make that purchase at Hoover?

Mr. Bury: Of course that is our contention, that we do.

Mr. Goldberg: That you do.

Mr. Bury: That we do and pursuant to this agreement.

Mr. Goldberg: That you do purchase energy generated at Hoover and you purchase it from the United States?

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Mr. Bury: That is right.

Mr. Goldberg: So that with respect to the first purpose there is no occasion to introduce this contract or have any testimony with respect to it. There is no issue. It is agreed, apparently, on the record that Southern California Edison purchases energy at Hoover from the United States, which energy is transmitted over Southern California's own facilities not shown on Exhibit No. 1 or in the schematic diagram Exhibit No. 2 and transmitted into Southern California's system in California by way of Chino.

Now, with respect to the proposition that the sale is not subject to the jurisdiction of the Federal Power Commission, I take it that Southern California Edison is not referring to the sale by the United States to Southern California Edison of that power at Hoover, but, rather, the contention is that there is no jurisdiction in the Federal Power Commission over the sale by Edison for resale of that power to the City of Colton, is that right?

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Mr. Bury: I will wait until you have finished before I reply.

Mr. Goldberg: Now, that, then, poses a legal problem, and I don't know that any testimony respecting the contract has any bearing on it, because obviously Southern California Edison tells us that they are relying upon Section 6 of the Boulder Canyon Project Act, so all we have to do is look at

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Section 6 and construe it, so there is no occasion here, as I see it, even with respect to bottoming jurisdiction in the Federal Power Commission over the sale to Colton on the energy purchased at Hoover and transmitted via Chino with respect to these contracts.

Mr. Bury: Mr. Examiner.

Presiding Examiner: Mr. Bury.

Mr. Bury: I think all of this discussion merely points up that there certainly is an issue here and these contracts are relevant to our theory of this case. Granted they may not be relevant to Colton's theory of this case.

Also, I think that Mr. Goldberg's attempts to perhaps summarize or to characterize what this contract does, again, points out the necessity for having the contract in evidence. And I think we will find that this contract has a greater scope than just the purchase of energy at Hoover Power Plant by Edison from the United States, which is transmitted over the lines via Chino. This contract has a much broader scope than that.

I am not asking the witness to interpret the contract, I merely wish to lay a foundation for its introduction in evidence and obtain a very short summary which may be of some assistance to us in considering those contracts.

We also, obviously, have a very different view from the City of Colton over the nature of the transactions between

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Edison, the United States, and the Metropolitan Water District concerning the energy to which Metropolitan Water District is entitled, but does not use.

It is our contention and which we believe will be established by the introduction of the contracts, that that is not a sale by the Metropolitan Water District to Edison, but a sale by the United States to Edison, because we believe the Boulder Canyon Project Act and these contracts establish that if Metropolitan Water District does not use the energy allotted to it, it releases that energy to the United States for the disposition to others, and that contract for the resale of unused firm energy is a contract of sale between the United States and Edison and, again, a contract made pursuant to the Boulder Canyon Project Act and the Boulder Canyon Project Adjustment Act. So we can—pardon me, Mr. Goldberg, just to go on, because we have some other contracts which are in here also.

In addition to the '45 resale contract, so-called, which is the one to which I just referred for the sale of firm energy unused by Metropolitan Water District, there is the so-called 1945 Collateral Contract, which among other things is a contract whereby Edison obtains the use of the unused capacity of generators assigned to the Metropolitan Water District and the unused capacity of the District's transmission line. That is, the capacity over and above that required by the District

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for pumping.

We believe all those contracts are necessary in this record so that we may have an understanding of the relationships between the parties, those contracts have a vital effect on the issues in this proceeding and particularly

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the application of the Boulder Canyon Project Act to the record which we will make here.

I think—I don't want to go through those arguments at this time, it is inappropriate. I think as we have indicated before there is a very full statement of our position to the effect that the Boulder Canyon Project Act as stated in the exchange of correspondence which is Exhibit C to the motion to dismiss——

Mr. Goldberg: I don't want to prolong this. I think it is important that we expose on the record for the benefit of each of us exactly what these issues are and how this bears on it.

Now, I understand, Mr. Bury, that you are taking the position that the contract which you wish the witness to summarize, and perhaps some of the others, bear on the purchase of energy from the United States at Hoover which is transmitted over your own lines via Chino, but also bears on the transaction which takes place at Hayfield involved in the Staff's tracing, is that right?

Mr. Bury: Yes, that is the foundation, basic foundation

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of it.

Mr. Goldberg: All right.

Now, do I correctly understand that the company's position is that these contractual relationships, such as they are, of themselves, preclude the exercise of Federal Power Commission jurisdiction over the company's sale for resale to Colton, or is it the provisions of the Boulder Canyon Act that the company relies on for that? And I take it is the sale to Colton to which you are addressing yourself when you say precludes Federal Power Commission jurisdiction?

Mr. Bury: I think, as I say, the arguments will be more fully developed at other times, but if it will help I

will summarize it very briefly right at this point. This is not intended to be complete. Certainly, it is our position that when the Boulder Canyon Project was under consideration it received very special Congressional attention as is reflected by the Boulder Canyon Project Act, and we believe that it is clear from an understanding of that Act that when Congress considered this specific Federal project it decided that the Secretary of Interior, rather than the Federal Power Commission, should have jurisdiction over the sales for resale in interstate commerce made by parties who purchased energy from that project under contracts with the United States.

Mr. Everett: Mr. Examiner, may the staff be heard?

Presiding Examiner: Yes.

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Mr. Everett: First of all we have a very simple question to ask of Mr. Bury, and this is just for our enlightenment, Mr. Bury. With regard to this energy which Mr. Miller testified to as being purchased by Edison Company from M.W.D. at Hayfield, as strictly a business matter, does Edison Company pay M.W.D. for that energy, or does it pay the United States?

Mr. Bury: The witness may correct me—maybe I can save time—my understanding is that we pay the United States the energy charges for that.

Mr. Everett: That is with respect to all the energy which you receive from M.W.D. at Hayfield?

Mr. Bury: I believe that is correct.

Mr. Everett: Thank you.

Mr. Examiner, Mr. Bury just mentioned that when the Congress was considering the bill which later became law and which is now known as the Boulder Canyon Project Act, that Congress decided that the Secretary of Interior should have certain regulatory powers. However, the

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Staff thinks it is important to point out that this Act, The Boulder Canyon Project Act, was passed in 1928. That is seven years before the Congress, this same branch of the Government, enacted the statute which the Staff believes to be applicable here, namely the Federal Power Act. It is true in 1928 there was on the books of the Federal Water Power Act of 1920, but these provisions of the Federal Power Act with which we are concerned with here, namely Parts 2 and 3,

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were not enacted by the Congress until 1935. As you will recall, under the provisions of the Public Utility Act of 1935, specifically Title 2, the Federal Water Power Act of 1920 became Part 1 of the Federal Power Act and Parts 2 and 3 were added to that Act. So when Mr. Bury says that the Congress in considering this matter of regulating the persons—and I am using that in the broad sense to include individuals and corporations, public and private, unincorporated associations and so forth—when Congress was considering how it should regulate those persons which were to benefit from this Boulder Canyon Project Act there was no statute on the books which we refer to today as Part 2 of the Federal Power Act. That statute did not come into being until seven years later.

Mr. Bury: If I may make a very short response——

Mr. Goldberg: On this very same point let me draw the Examiner's attention to a fact.

Mr. Bury: All right.

Mr. Goldberg: —That the question of exemptions from the sweep of Part 2 of the Act were vigorously argued in United States versus Public Utilities Commission by California Electric Power Company before the Supreme Court of the United States; and in no uncertain terms the

Supreme Court rejects any notion that there are any exemptions from the sweep of Section 201(a) of the Act such as would be contended for here.

The Court says in part "So we conclude"—after a very

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comprehensive analysis of Section 20, which has language in it appearing to delegate jurisdiction over interstate hydro-energy to the states—"So we conclude that the limitations of Section 201(a) on Federal regulation cannot and were not intended to preserve an exclusive state regulation of wholesale hydroelectric sales across state borders."

Now, notice, notice not only that this Boulder Canyon Project Act was enacted in 1928 when Section 20 was the only Federal statute dealing with interstate sales of energy, but notice that the Secretary of Interior is directed to conform with the requirements of the Federal Water Power Act in at least two places in that provision of Section 6. So that you are always driven back to this analysis by the Supreme Court of what Section 20 meant, what could or could not be done by the states, and the effect of Section 201 in 1935.

And in that connection the Examiner will be interested in observing that somewhat similar contentions were urged by Arizona Edison Company in the Ninth Circuit Court of Appeals, and the Court there rejects as wholly untenable contentions not unlike those that the company makes today.

But I still don't think I have an answer to what I am here seeking, and that is: Is this contention about exemption from Federal Power Commission jurisdiction by reason of the Boulder Canyon Project Act and/or the contracts to which Mr. Bury refers directed at the sale for resale to Colton or are

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we talking about the sale by the United States? I would like to have an answer to that.

Mr. Bury: It most certainly is directed to the sale to Colton. The sale by the United States to Edison very clearly is exempted by 201(f) of the Federal Power Act. There is your import purchase of energy from out of state which would be subject to Federal regulation were it not from a Federal project under a contract with the United States and exemption under 201(f). Of course Mr. Goldberg has cited the case of the United States versus the Public Utilities Commission where they argue the effect of Section 20 to the Federal Power Act. They certainly there were not concerned with the particular statute we have here, and I said that Hoover was unique and there is no other Federal project which has been the genesis for legislation of this type. It is unique.

Presiding Examiner: Mr. Bury, excuse me, are you through?

Mr. Bury: No, I had one more statement that I wish to make because they mention the timing involved here. And I think the timing is important. Granted, the Boulder Canyon Project Act did precede Part 2 of the Federal Power Act, it did follow, of course, the Attleboro Decision, and I think the problem of the need for Federal regulation was before Congress at that time.

And Congress specifically directed in this case, when it vested authority in the Secretary of the Interior, that he

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should conform with the provisions of the Federal Water Power Act.

Now, that certainly is entirely inconsistent with any position that the Federal Power Commission should con-

form to the Federal Water Power Act. If he did not have authority to regulate, why would that direction be there?

They not only direct that he conform with the provisions of the Federal Water Power Act and the rules and regulations of the Federal Power Commission, which have been devised—and we are speaking in 1928—or which may hereafter be devised for the protection of the investor and consumer.

I think that is a specific answer to the problem which Mr. Goldberg seems to think exists.

Mr. Goldberg: I am delighted to have Mr. Bury emphasize "or which may hereafter be devised." Obviously Part 2 was hereafter devised.

Mr. Bury: Right.

Mr. Goldberg: Regardless of whether the Boulder Canyon Project Act was before the Supreme Court or not, the Supreme Court examines the question of regulation of interstate sales, vis-a-vis states and the United States, as the first positive congressional action in the field of course was the Water Power Act of 1935. Now that is the Supreme Court speaking at a time when Section 6 of the Boulder Canyon Project Act is already on the books and this is unequivocal language, the first positive

congressional action. That is apparent from Section 6. There is nothing in Section 6 conferring regulatory jurisdiction upon the Secretary of the Interior or authorizing him to confer it upon the states.

Mr. Everett: Mr. Examiner——

Presiding Examiner: Mr. Everett?

Mr. Everett: Mr. Bury mentioned a moment ago Section 201(f) of the Federal Power Act. Well, there are no exceptions from the provisions of Part 2 of the Fed-

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eral Power Act on the ground that the transactions which would otherwise be subject to regulation by the Federal Power Commission under that part are subject to regulation under the Boulder Canyon Project Act.

And a study of the legislative intent with respect to Section 201 does not show any intent on the part of the Congress to exempt from the scope of Part 2 of the Act any transaction or any activity which may, in some way, be subject to regulation under the Boulder Canyon Project Act.

Now, it can't be said that there was a conflict of jurisdiction and Congress simply overlooked that conflict, because Congress very carefully recognized in some situations there is a conflict of jurisdiction, and an example of that is contained in Part 3 of the Federal Power Act which was enacted at the same time that Part 2 was, in 1935. And in Part 3 in Section 318 there is a provision there that if, with respect to certain transactions, a person—and there again I am using that word

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in the broad sense to include individuals and corporations and so forth—if a person should be subject to both the Federal Power Act and the Public Utility Holding Company Act of 1935, then, in such a case the person shall be subject to the Public Utility Holding Company Act of 1935 and not to the Federal Power Act, unless, of course, the Securities and Exchange Commission, which administers the Public Utility Holding Company Act of 1935, has exempted that person from the provisions of the Holding Company Act, in which case the person would be subject to the Federal Power Act.

Now, under Mr. Bury's theory, it would seem that if the Congress had intended to exempt from—if the Con-

gress thought that there was any conflict of jurisdiction here between the Federal Power Commission's regulatory powers under the Federal Power Act and the Secretary of Interior's regulatory powers under the Boulder Canyon Project Act, that the Congress could have inserted in the Federal Power Act in 1935 a provision comparable to Section 318 which we have just mentioned.

It appears to the Staff that this Section 6 of the Boulder Canyon Act was inserted in that Act, as Mr. Bury said, to take care of the so-called Attleboro gap, which resulted from a decision by the Supreme Court of the United States one year previously, 1927, holding that a sale of electric energy in interstate commerce could not be regulated by a state. The citation for that case—I think it is already in the case,

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but if it isn't—is Public Utilities Commission of Rhode Island against Attleboro Steam & Electric Company, reported Volume 273 of the U. S. Reports at page 83. But this section of the Boulder Canyon Project Act of 1928 was sort of a situation of—a case of filling the Attleboro gap on an ad hoc basis, whereas Title 2 of the Public Utility Act of 1935, the one we now know as the Federal Power Act, represented a comprehensive filling of that gap on a national basis, and it is the Staff's position that insofar as the company contends that except for the Boulder Canyon Project Act as amended by this Boulder Canyon Project Adjustment Act, that the FPC would have jurisdiction over Edison's wholesale electric to Colton, then this contention is without merit, because the Boulder Canyon Project Act as amended by the Boulder Canyon Project Adjustment Act does not deprive the Federal Power Commission of this jurisdiction which it

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has under Part 2 of the Federal Power Act. That Boulder Canyon Project Adjustment Act which was enacted in 1940 does not in any way, as we read it, increase the regulatory powers of the Secretary of the Interior and neither does it take away any regulatory powers from the Federal Power Commission.

Mr. Goldberg: I just want to say this, Mr. Examiner: Let's look at Section 6 of the Boulder Canyon Project Act that we are talking about. It says that the Secretary of the Interior shall prescribe and enforce rules and regulations

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conforming with the requirements of the Federal Power Act so far as applicable respecting maintenance of works and condition of repair adequate for their efficient operation, maintenance of a system of accounting, control of rates, and service in the absence of state regulation or interstate agreement. Now what is there in that that excludes Federal Power Commission regulation under an act of Congress to control sales for resale in interstate commerce which the Supreme Court of the United States has said has no exempting limitations in it? How can you possibly read an exemption into it? I don't know why we waste our time on these things.

Mr. Bury: Let me close up briefly.

I certainly would agree with Mr. Everett's statement that the enactment of Section 6 of the Boulder Canyon Project Act was intended to fill the Attleboro gap known to exist at that time and he says why is there no specific treatment in the Part 2 of the Federal Power Act? He seems to think that there is an apparent conflict. I certainly can see in my opinion there is no conflict, because very clearly the authority is given to the Secretary of Interior and not to the Federal Power Commission, and

the Federal Power Commission appeared and screamed about being deprived of jurisdiction at that time. They said as shown by the Congressional history of that Act that this was divergence from an established policy of having uniform Federal control. All of this merely sums up the fact

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that we certainly have an issue in this proceeding and that the contracts are necessary in the record to lay the factual basis on which those statutes can be applied and they certainly are relevant and we wish them in the record, and I would like—excuse me, I want to mention one other thing.

Perhaps all of this argument is a little bit premature because the contracts have not been offered yet, but of course, they will be as soon as we have identified them all, and I would hope we would not have to go through this again.

Mr. Goldberg: If we have an issue the issue stems from an interpretation of the Boulder Canyon Project Act, Section 6, not from any contract, and we have no issue here as to a factual matter. It matters not whether the energy which you purchase which is generated at Hoover is from the Metropolitan Water District at Hayfield or purchased from the United States at Hayfield.

They are addressing the claims with respect to Section 6 of the Boulder Canyon Project Act to the sale for resale to the City of Colton and that isn't affected one iota by how or when or where they purchased the energy they resell.

Mr. Everett: Mr. Examiner, just to clear the record.

Presiding Examiner: Mr. Everett.

Mr. Everett: The Staff didn't mean to imply that it thought that there was a conflict between the Federal

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Power Act and Boulder Canyon Project Act; it simply meant to state

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that if Congress thought there was such a conflict then Congress would have resolved that conflict by putting a provision in the Federal Power Act of 1935 similar to that Section 318 we just mentioned. And we agree with Mr. Bury's analysis of the legislative history of the Boulder Canyon Project Act insofar as he says that the Federal Power Commission, as it existed at that time, did wish to have this Boulder Canyon Project brought within its jurisdiction. But the Commission, we believe, in so requesting Congress, intended to have the project brought within the what we now know as Part 1 of the Federal Power Act, that is the licensing provisions. Of course, as we all know, Congress by separate legislation authorized the construction and operation and maintenance of these facilities which we now refer to as Hoover. But at that time in 1928 when this Boulder Canyon Project Act was pending before the Congress and the members of the Federal Power Commission appeared before the Congressional committees, they were simply asking, as the Staff understands it, to have this proposed project brought within the jurisdiction of the Federal Power Commission, and that jurisdiction was set forth in what we now know as Part 1 of the Federal Power Act and which at that time was known as the Federal Water Power Act of 1920.

In other words, the Staff believes that the Federal Power Commission at that time was asking Congress, in effect, to make this Boulder Canyon Project a licensed project, but they were not—

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the Federal Power Commission was not asking to have this project brought within the scope of what we now

know as Parts 2 and 3 of the Federal Power Act because those parts were not on the books then, they were not enacted until seven years later.

Mr. Bury: Mr. Examiner, because we have had quite a bit of argument I think it might be a good time for me to perhaps bring all of this to a head and ask the witness a few questions to identify some of these things and then we can proceed.

By Mr. Bury:

Q. Mr. Montgomery, in the same volume, which is Exhibit No. 14 for identification, I will show you a contract appearing at pages 74 through 90 and ask you if that is a true and correct copy of the contract between the United States of America, Reconstruction Finance Corporation, City of Los Angeles, Southern California Edison Company, California Electric Power Company, and Metropolitan Water District of Southern California entitled "Contract for Resale of Electric Energy at Boulder Dam Power Plant," commonly referred to as the 1945 resale contract to which I made reference earlier? A. That is correct.

Q. I ask you if there also appears at pages 91 through 102 of Exhibit 14 for identification a contract captioned "Contract providing for the use of certain generating equipment at Boulder Power Plant, apportionment of charges therefor, and

other matters," sometimes known as the 1945 Collateral Contract to which I made reference? A. That is right.

Q. I show you now at pages 103 through 110 of Exhibit 14 for identification what appears to be a contract between the Metropolitan Water District of Southern California and Southern California Edison Company Limited, which

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is a contract for use of Metropolitan Water District transmission facilities, sometimes referred to as the District-Edison Transmission Contract which I mentioned earlier.
A. That is right.

Mr. Bury: Mr. Examiner, I would like to offer in evidence at this time the contracts which have just been identified and which appear on pages 1 through 110 inclusive of Exhibit 14 for identification. I really hope we do not have to argue this again at this time.

Mr. Everett: Mr. Examiner?

Presiding Examiner: Mr. Everett?

Mr. Everett: Mr. Examiner, the Staff objects to the admission of these contracts and the reasons for that we believe have already been set forth on the record, namely that the operation of Hoover Dam is not in issue here and that the company is not acting as an agent, an operating agent of the United States in selling energy to the City of Colton and that these contracts do not show that Edison Company's wholesale

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electric service to the City of Colton is exempt from Federal Power Commission jurisdiction.

Mr. Goldberg: Mr. Examiner, I am not going over all the arguments we have made other than to again direct your attention to the controlling effect of the decision of the Supreme Court of the United States in United States of America versus Public Utilities Commission of the State of California, and California Electric Power Company, reported at 345 US 295, where the Supreme Court of the United States points out the situation that existed prior to Attleboro and subsequent to Attleboro—and with a reading of that decision and the reading of the provisions of Section 6 it is obvious that the comprehensive jurisdiction conferred upon the Federal Power Commission

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by Part 2 of the Act cannot be denied by any tortured construction of Section 6.

Beyond that, Mr. Examiner, we think it wholly inappropriate that this record be burdened or that we be burdened now or in any review proceedings that may ensue with portions of this voluminous document which cannot possibly have any bearing on the issues Southern California would urge. And I think that Southern California Edison should be required in making its offer to specify with particularity the portions of the contracts that run to this issue.

Now, certainly we are not going to be burdened with provisions like "No energy to be delivered without payment." What

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in heaven's name can that have to do with the issue? Or that the contract may be terminated in default of payment, or access to books and records, or the use of public and reserved lands or how disputes and disagreements are to be resolved, and priority of claims and so on and so on ad infinitum. What possible relevance can that have?

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Mr. Bury: May I make just one short comment?

Presiding Examiner: Mr. Bury?

Mr. Bury: Two things——

Mr. Goldberg: Let me just point out that what we say is required as set forth in Section 1.26(c) of the Commission's rules; which say that "Where relevant and material matter offered in evidence is embraced in a document containing other matter not material or relevant and not intended to be put in evidence, the participant offering the same shall plainly designate the matter so offered,

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segregating and excluding, insofar as practicable, the immaterial or irrelevant parts."

Mr. Bury: Are you through, Mr. Goldberg?

Mr. Goldberg: Temporarily.

Mr. Bury: Mr. Goldberg has cited the case of the U.S. versus the Public Utilities Commission. That case is certainly not controlling as to an issue not raised in that proceeding, which is the effect of the statute here. And we can not avoid an issue simply because it is complex, and this is a complex issue. We have designated in this particular volume the contracts contained in there which we believe to be relevant in this proceeding, and have not other matter which happens to be included in that volume which is not relevant.

We believe that those contracts can not properly come into this record in pieces, and we would like a ruling on our

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offer of these contracts in evidence at this time.

Presiding Examiner: As I understand, you are offering the first 110 pages?

Mr. Bury: That is correct.

Presiding Examiner: The objections to the admission of Exhibit 14 are overruled, and Exhibit 14—the first 110 pages of Exhibit 14 will be admitted at this time.

(The document heretofore identified as Exhibit No. 14 was received in evidence, as modified above.)

Presiding Examiner: You may proceed with the examination of this witness, Mr. Bury.

By Mr. Bury:

Q. Mr. Montgomery, referring to the contract dated May 29, 1941, between Edison and the United States for

the sale of electric energy, which I think hereafter I will refer to merely as Edison's energy contract, for the sake of brevity, which appears at pages 1 through 73 of Exhibit 14, would you briefly summarize the contents of that contract? A. Under this contract for sale of electric energy, the U. S. agrees to sell and Edison agrees to take and/or pay for certain amounts of energy from Hoover power plant for a term ending May 31, 1987. The contract provides for, among other things, the assignment for Edison's use of certain facilities at the power plant, including Units A-5, A-6 and A-7, and related equipment.

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Under Exhibit 2 of the contract, the general regulations for generation and sale of power makes certain definition of terms and provides for the operation by the U.S. directly or through agents, defines firm and secondary energy, and shows the allocations of energy to the several allottees of firm energy. The firm energy allotments are approximately 17 per cent each to the State of Nevada, the State of Arizona, and the City of Los Angeles, and approximately 35 per cent to the Metropolitan Water District, seven per cent to Edison, and lesser amounts to the Nevada-California Power Company, which is now the California Electric Company, Burbank, Pasadena and Glendale.

It also provides for the allocation of secondary energy to Los Angeles, the Edison Company and California Electric in the proportions of 55, 40 and 5 per cent, respectively, subject to the first call and prior rights on the secondary, on all secondary energy, of the Metropolitan Water District.

The regulations also provide for charges. These charges are in really two parts; one consisting of an

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energy charge and the other a generating charge. These charges are determined by criteria designed to cover the full costs of operations, maintenance, replacement and retirement of the investment with interest. The regulations also provide and permit by agreement the use of equipment of one allottee by another allottee.

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In Exhibit 1 of this contract there is a contract for the operation of the Boulder power plant. This is between the U.S., the City of Los Angeles, and Edison. It is also dated May 29, 1941, and has the same term as the Edison energy contract ending May 31, 1987. Under this contract for the operation, commonly called the agency contract, the City of Los Angeles and Edison are designated as agents of the U.S. for the operation and maintenance of portions of Hoover power plant.

Edison is the agent for the operations of units A-5, A-6 and A-7, which are assigned to Edison under the energy contract, and also for the operation of unit A-8, which is assigned to the California Electric Corporation. The City of Los Angeles, on the other hand, is the operating agent for the units assigned to it and also to other public agencies, including N-5 and N-6 units, which are assigned to the Metropolitan Water District.

This agency contract also specifies in detail the properties to be operated and maintained and replaced by the agents. It also sets forth the powers and duties of the director, which authorizes him to have general supervision over the operation and maintenance by the agents. And it provides for integration of operations. One of the first provisions under this integration of operations clause is a provision for interchange of energy between the U.S. and the

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Metropolitan Water District. One provision of interchange is a condition that there shall be no impairing or extending of the rights or obligations of the other allottees of energy.

Also under the integration of operations section, and subject to the prior rights of river regulations and improvement of navigation and flood control, irrigation and domestic needs, the satisfaction of perfected rights, the operations are to be reasonably integrated with the operation of other projects on the Colorado River, other projects of the U.S. on the Colorado River, and also with the operations by the operating agents of their respective systems, including their other sources of electric energy.

It states specifically that such reasonable integration of operation shall be with the view of effecting economical and efficient use of the water of Boulder Dam and at such other projects and at the operating agent's other sources of electrical energy.

Mr. Goldberg: Have you finished?

The Witness: Not yet, sir.

Mr. Goldberg: I wanted to ask you a question as to when you keep speaking of the agency contract, which one is that in Exhibit 14?

The Witness: The contract for the operation.

Mr. Goldberg: At what page does it begin in Exhibit 14?

The Witness: I have a different book.

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Mr. Bury: Excuse me, Mr. Goldberg. He is working from a different book.

Mr. Goldberg: Well, if you can tell me, which one is it that he keeps calling the agency contract?

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Mr. Bury: Just a second. I will identify the pages for you. It appears on pages 13 through 37. I might make this explanation: The agency contract is printed in Exhibit 14 in the form of an exhibit to the Edison energy contract. It is our intention to have that agency contract as a contract, in and of itself, a part of this record, but we saw no reason to have a separate document to accomplish that purpose.

Mr. Goldberg: All right. In other words, the Edison energy contract appears in Exhibit 14, beginning at page one, and ending at page 10; is that right?

Mr. Bury: That is right. And attached to it as exhibits are the agency contract, from pages 13 through 38, and as a second exhibit, I guess called "A", of the general regulations of the Secretary of the Interior, pages 39 through to the end on page 73.

Mr. Goldberg: 39 to 73?

Mr. Bury: Yes.

Mr. Goldberg: Now, may I, not intending to interrupt, but for the sake of clarification: When you refer to operating agent, you are using those terms as they are used in the contract, is that it?

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The Witness: That is right.

Mr. Bury: Let me make this clear. I did not intend to have Mr. Montgomery's testimony be any interpretation of the contracts. The contracts are certainly controlling.

Mr. Goldberg: Yes. What was bothering me was you call it an agency contract, an operating agent, and in law they have special meanings which may not necessarily be the meanings of this contract. Thank you very much.

Presiding Examiner: Proceed.

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The Witness: Well, proceeding with the provisions of the contract between U.S. and Edison and the City of Los Angeles for the operation of Hoover power plant, commonly referred to as the agency contract, in addition to the items I have already enumerated it also provides for meeting at least once each calendar year between the Secretary, or his representative, and a representative of each of the two operating agents, this meeting for the purpose of programming integration of operations.

And it states that if there is no agreement for the integration of operations, or no agreement in effect, that the Secretary shall determine and announce to the allottees the program of integration of operation. It also provides under this integration of operations section that the Secretary may take charge of operations, of either operating agents, if either operating agents shall fail to comply with the program

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of the integration of operations agreed to or decided upon. And it provides for the compensation of the operating agents for the operation. Each operating agent shall receive as compensation for the performance of its duties hereunder equal to the aggregate of all costs properly and reasonably incurred by it in such performance.

By Mr. Bury:

Q. Mr. Montgomery, does that conclude your explanation—— A. Well, that is a very brief summary. It is quite a complex relationship.

Presiding Examiner: Shall we take the morning recess at this time?

Mr. Bury: Yes.

Presiding Examiner: Fifteen minutes.

(Whereupon, at 11:09 a.m., a recess was taken to 11:24 a.m.)

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Presiding Examiner: Are you ready, Mr. Bury?

Mr. Bury: Yes.

By Mr. Bury:

Q. Mr. Montgomery, in your experience with the Edison Company have you also become generally familiar with the properties of the Metropolitan Water District of Southern California and the manner in which they are operated? A. Yes, I am.

Q. Would you very briefly describe the M.W.D. aqueduct and electric system by reference to Exhibit 12?

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A. The Metropolitan Water District aqueduct and transmission power systems consist essentially of a power system, five pumping plants, and a main aqueduct. The aqueduct is about 240 miles long, extending from the Colorado River, near Parker, Arizona, to Lake Mathews, which is just south of the City of Riverside. The power system consists of N-5 and N-6 generators at the Hoover plant, which are owned by the U.S. and operated by the Department of Water and Power of the City of Los Angeles, as an agent of the U.S.

The terminal switching facilities for the 220 kv transmission lines and the connection to the generator source at Hoover, 220 kv transmission line, which extends from the Hoover power plant south to the junction point at Camino, and then one branch over in the southeast direction to Gene pumping plant, which is located near the Parker Dam on the Colorado River, and the other branch extending on south and then westerly and terminating at Hayfield, and going through the other two pumping plant locations of Iron Mountain and Eagle Mountain enroute.

Now, then, each of these pumping plant locations that I have named; that is, Gene, Iron Mountain, Eagle Moun-

tain and Hayfield, at those points there are substations, step-down transformation facilities and switching facilities to serve the pump motors.

Now, the Intake pumping plant, the fifth pumping plant

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called Intake, is located over on Lake Havasu, proper, and is supplied energy or power from the Metropolitan Water District through the Gene pumping plant substation. The total pump lift in these five pumping plants is approximately 1350 feet. Then it is gravity flow from the Hayfield tunnel, which is the last lift, to Lake Mathews. And this reservoir, Lake Mathews, south of Riverside, is the source of the distribution feeder system of the Metropolitan Water District, then, in the Los Angeles metropolitan area.

Q. Mr. Montgomery, are you generally familiar with the nature and size of the electric requirements of the various Metropolitan Water District pumps? A. Yes, I am.

Mr. Bury: I would like to have identified at this time a letter dated December 1, 1959, on the letterhead of the Metropolitan Water District of Southern California, addressed to Mr. W. E. Montgomery, Vice President, Southern California Edison Company. It is a three-page letter, and is signed Robert B. Diemer, General Manager and Chief Engineer.

Presiding Examiner: That will be marked Exhibit No. 15 for identification.

(The document above referred to was marked for identification as Exhibit No. 15.)

By Mr. Bury: Mr. Montgomery, except for the first paragraph of that letter, which is merely introductory, does

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the balance of that letter correctly describe portions of the pumping system and electric requirements, as they have existed from time to time, of the Metropolitan Water District? A. Yes, it does.

Mr. Bury: Perhaps we might offer this letter in evidence at this time. I appreciate it is a letter from another party, but I believe the question has been phrased to indicate that Mr. Montgomery has personal knowledge of the contents of that letter.

Mr. Goldberg: Do you mean by that——

Mr. Bury: Personal knowledge of the facts which appear in the letter, independent of the letter.

Mr. Goldberg: You mean he could have testified without this letter to these facts?

Mr. Bury: Yes, I think that is correct.

Presiding Examiner: Hearing no objection to the letter, Exhibit 15 will be admitted in evidence at this time.

(The document heretofore identified as Exhibit No. 15 was received in evidence.)

By Mr. Bury:

Q. Mr. Montgomery, what energy resources are available to MWD? A. Well, the Metropolitan Water District has a contract and an allocation of 35 per cent of the firm Hoover

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energy and, as I previously indicated, first call on secondary on all secondary energy from the Hoover project, and also a right to the States allocation of unused firm energy.

Since December 14, 1952, Metropolitan Water District has had an entitlement to one-half of the power privilege of the U.S. Parker powerhouse. Metropolitan Water District also has a contract with the Edison Company for

supplemental energy requirements in addition to that energy available to them from Hoover and Parker power plants.

Q. Mr. Montgomery, referring back for a moment, to Exhibit 12, you indicated or described the electric system of M.W.D., including the line extending from Camino down to Gene. That map also indicates some facilities, a very short piece of 220 kv transmission line from Gene over to Parker power plant. Is that line owned by the U.S.B.R.? A. Yes, it is. The Metropolitan Water District interconnects with the U.S.B.R. system at Gene, a line extending, as you have indicated, from the U.S.B.R. system at Parker power plant, 220 thousand volts.

Q. You referred to the date of December 14, '52, as the beginning of M.W.D.'s entitlement to one-half of the power privilege from Parker power house. Was it at or about that date that that short piece of 220 kv transmission line from Parker to Gene first went in service? A. No, it was previous to that date. May I check my

notes?

Q. Certainly. A. The 220 kv tie-line from Gene to Parker power plant went in service on May 29, 1947.

Q. I see. When did Davis power plant go into operation? A. Davis was placed in operation, the first unit, in early 1951.

Q. Do you happen to know at what time all of the generating facilities now located there were in service? A. I think it was completed—I don't have the specific dates by units, but I think it was completed in 1951, or early 1952, all five units were in operation.

Q. Thank you. Would you explain, generally, the affect (sic) of (sic) the operation of the M.W.D. aqueduct and electric system have upon the operation of Edison's electric system? A. Well, historically, the Metropolitan

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Water District has not used all of its Hoover firm energy entitlement. And this situation led to the 1945 contract for the resale of Metropolitan Water District unused firm energy, and also the 1945 collateral and transmission contracts.

These contracts gave Edison the right to a share of the Metropolitan Water District's unused firm energy, and also the right to the unused capacity of units N-5 and N-6 assigned at Hoover power plant for the use of the Metropolitan Water Dis-

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trict, and in addition, to the unused transmission line capacity to the District's transmission system from Hoover plant at Hayfield.

In these contracts, the M.W.D. agreed to the use of Parker energy in preference to energy from Hoover. This particular agreement is covered in Section 203-A of the collateral contract. This provision makes the maximum amount of Metropolitan Water District unused energy and capacity available to Edison from Hoover.

The delivery to the Metropolitan Water District from the Parker power house is so controlled that approximately one half of the Parker power plant generation is continuously delivered to the Metropolitan Water District system. The balance of the Metropolitan Water District energy requirements must come from either units N-5 and N-6, at Hoover, or from the other end of their system, the interconnection with Edison at the Hayfield interconnection point. Under the interchange contract, Edison supplies the Metropolitan Water District energy during off-peak periods, so that generation on units N-5 and N-6 is thereby reduced.

Then during on-peak periods, units N-5 and N-6 on the Metropolitan Water District system, are operated at higher capacity so as to supply M.W.D. requirements.

The Metropolitan Water District then returns this interchange to Edison by making available—making water avail-

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able at Hoover for generation on Edison's Units A-5, A-6 and A-7, and this energy is transmitted then to the Edison system by way of Chino.

Q. What has been——

Mr. Goldberg: Before you go on, you referred to a collateral contract. Is that included in Exhibit 14?

The Witness: Yes, it is.

Mr. Goldberg: And which one is that?

Mr. Bury: Just a moment, Mr. Goldberg, perhaps I will give you a page reference.

Mr. Goldberg: All right.

Mr. Bury: The 1945 collateral contract, to which Mr. Montgomery referred, commenced on page 91 of Exhibit 14, and the particular provision 203-A, to which he referred, appears on page 98. The District-Edison transmission contract, to which he referred, commences at page 103 and runs through page 110.

Mr. Goldberg: Thank you very much.

By Mr. Bury:

Q. Mr. Montgomery, what has been the particular affect (sic) of the addition by M.W.D. of more pumps from time to time at each of its pumping stations? A. Well, the addition of the pumps on the M.W.D. system reduces the unused generation capacity available from N-5 and N-6 units at Hoover power plant, and also reduces the unused

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capacity of the Metropolitan Water District transmission line, thereby reducing the amount of energy that can be

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delivered to the Edison system generated on the unused capacity of N-5 and N-6 units at Hoover and transmitted through the unused capacity of the Metropolitan Water District transmission line.

Q. Mr. Montgomery, were you present when Mr. Sample testified as to the preparation of certain studies on Edison's A.C. network analyzer? A. Yes, I was.

Q. Are you generally familiar with that calculator and its operation, and with the data that is shown on the exhibit sponsored by Mr. Sample, which I believe is Exhibit 11? A. Yes, I am.

Q. Mr. Montgomery, from your experience, from your familiarity with those studies, what conclusions, if any, can you draw from those studies?

Mr. Goldberg: This question asks him what conclusion he draws from Exhibit 11?

Mr. Bury: That is right.

The Witness: Well, I don't know that I can draw any conclusions from these studies with respect to the specific source of generation of power flow on the Metropolitan Water District transmission system. The studies do show, of course, conditions that are known to exist on the Metropolitan Water

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District system, on the physical system, wherein the Metropolitan Water District pump loads have exceeded the Parker-Gene deliveries through the period covered by the staff report.

By Mr. Bury:

Q. Just by reference, the types of data reported in Exhibit 3, which is the power flow data which had previously been the appendix to the staff engineering report? Is the answer yes? A. That is right.

Mr. Goldberg: If it isn't too much trouble, I would like to have that answer read in which reference is made to the load of the pumping stations in relation to Parker and Davis. I think it was the answer immediately preceding this last question and answer.

Presiding Examiner: Will you read it, Mr. Reporter, please?

(Answer read.)

Mr. Goldberg: Thank you.

By Mr. Bury:

Q. In operating an electric system like Edison's, how do you determine the amount of power flow present at any point on that system? A. Well, it is usually measured by watt-meters.

Q. If there are no meters at a point on the system in question, can the power flow or the direction of that flow

be measured? A. If there are no meters, obviously it can not be directly measured. However, as Mr. Sample indicated in his testimony here, the A.C. network analyzer can be set up to duplicate the electrical characteristics of the physical system, and then meters can be inserted at various points on that replica system and readings taken.

Q. Can you, either through the use of watt-meters or through the use of the A.C. network analyzer, identify the power flow being measured at a point on an interconnected system with the specific generation source producing that power being measured? A. There is no way that I know to do it.

Q. Mr. Montgomery, is it either necessary or convenient to you, in the operations of Edison's integrated and interconnected electric system, that the source of generation supplying any given load be known? A. No, it is not.

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Q. Mr. Montgomery, I forgot a question I wanted to ask you. Do you know the approximate effective generating capacity or capability of Parker power plant? A. It is approximately 100,000 kilowatts, four units.

Mr. Bury: Mr. Examiner, I would like to have identified as an exhibit a single sheet entitled "Southern California Edison Company, Net Generation; i.e., Kilowatt-Hours Trans-

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mitted, Years 1954 through 1958."

Presiding Examiner: That will be marked Exhibit 16 for identification.

(The document above referred to was marked Exhibit No. 16 for identification.)

By Mr. Bury:

Q. Mr. Montgomery, was Exhibit 16 prepared under your supervision and direction? A. Under my general supervision, yes.

Q. You have pointed out that Edison's entitlement to energy from Hoover power plant is only one of the many energy resources available for the operation of the Edison system. What is the significance or importance of Hoover energy delivered to Edison via Hayfield to Edison's system requirements? A. Well, it is a relatively small amount. For instance, referring to this Exhibit 16, under the source of generation, Hoover Units N-5 and N-6, and following that line across the page under the years 1954 through 1958, in terms of the percentage of energy opposite the line "Units N-5 and N-6", in terms of the total energy requirements of the entire Edison system which is shown at the bottom of the page, in 1954 the N-5, N-6 energy is 1.6 per cent of the total, in 1955 it is computed as half of one per cent; in 1956 it is two-tenths of

one per cent; in 1957 it is less than that, it is a negligible amount; 1958, it is seven-tenths of one per cent of the total

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energy requirements of the Edison system.

Mr. Bury: We would like to offer Exhibit 16 at this time.

Mr. Goldberg: May we have a statement of purpose?

Mr. Bury: I think that has been covered by the question and answer.

Mr. Goldberg: Well, I just wanted to be sure. We object to this, Mr. Examiner. It has no relevance to any of the issues. It doesn't tend to prove anything with respect to any of the issues.

To begin with, it is established as a matter of law that the amount of the energy is of no consequence with respect to the assertion of jurisdiction by the Federal Power Commission and the existence of its jurisdiction over a sale for resale. In other words, the matter of de minimis, even if the suggestion here is that the flows are de minimis, is beside the point. There is no exemption in the Federal Power Act, unhappily for Southern California Edison Company, in that respect.

But, moreover, the question here, if percentage were material, is not the percentage of the total out-of-state energy to other generation of Southern California Edison Company, of in-state origin, or of its total requirements. The only thing material there would be the percentage component of out-of-state energy to the total amount of energy sold to

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Colton, and on occasions I would imagine the percentages would vary, could possibly be in the very high magnitudes. I know of cases that the Federal Power Commission has

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had where, with respect to a particular sale, it varied from a very small percentage to a hundred per cent at times. So we therefore object to this exhibit as immaterial, irrelevant, not proving anything about any issue in the case.

Mr. Everett: Mr. Examiner, the staff objects to the admission of this exhibit for the reasons set forth by Mr. Goldberg.

Mr. Bury: We believe this exhibit is admissible, is relevant for at least two purposes. I think it goes to this question of tracing. I think we will find under the analysis of Dr. Sorensen's testimony that these relative proportions become important under the way he approaches the problem. I think this type of relationship is material to the approach that Dr. Sorensen says should be taken, or one of the approaches which may be taken to the solution of this problem of power flows.

It has another matter of relevance, I believe, and that is, while not precisely de minimis, I think the decisions do indicate that where you have these border-line cases, the shadow-land between Federal and State jurisdiction, that the Commission can consider these matters in exercising its discretion and has the power to exercise discretion to de-

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cline to act if it feels there is no matter of national interest involved.

We think this tends to substantiate the fact that this is essentially a matter of local concern, even if you adopt as true the staff's method of trying to trace power flows. That, of course, is a matter we do not concede, it is in dispute here, but even if admitted for the purpose of argument we think this material is relevant.

Mr. Goldberg: Mr. Examiner, I don't see how this could conceivably have any relation to advancing Dr. Sorensen's testimony or having anything to do with it.

The record plainly shows that Dr. Sorensen's position was that the issue is insoluble, you just throw up your hands and you can't do anything about it, you ignore the practicalities, the necessity for determination of jurisdiction or the basis upon which these folks do business.

Now, with respect to the shadow-land, there isn't any shadow-land here, there isn't any twilight zone. If it is a sale for resale in interstate commerce, it is subject to Federal Power Commission jurisdiction, and that is that. This argument that it is a matter of local concern, I think Southern California Edison should address that to Congress. Congress decided a sale for resale in interstate commerce is of national concern, period, that ends it.

Mr. Everett: Mr. Examiner, may the staff be heard?

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Presiding Examiner: Mr. Everett?

Mr. Everett: Dr. Sorensen, we believe, testified that you could not trace power flows. Therefore, it is difficult for the staff to see how this exhibit which is now under discussion could be used to illustrate any point brought out in Dr. Sorensen's testimony. Furthermore, if the amount of energy was material in determining the Commission's jurisdiction, Congress might have so stated in the Federal Power Act, but it did not do so.

There again, there is a section in the Part 2, where Congress did specify that the amount involved was of significance, for example, in Section 203 of the Act, with regard to the disposition of facilities, it does specify a certain limit there, $50,000.

But in regard to this matter we have under discussion here, there is no limitation on the amount of energy.

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Mr. Bury: Excuse me. I think perhaps I have not made myself clear. I think I can show wherein this information is relevant in analyzing the testimony of Dr. Sorensen. I admit Dr. Sorensen says the problem is insoluble on a scientific basis, there is no sound engineering method or any method with a sound basis in science by which power flows can be traced. He did indicate that the problem could perhaps be solved on some political level or by the use of certain postulates, one of which he indicated was random chance, the law of probabili-

ties. It is not scientific, but if you have to have an answer, perhaps that is one type of a solution you could apply. And if you are going to apply the law of probabilities, I think this will give you some measure to show how far we have come, or how far the staff is from proving their case.

Mr. Goldberg: Mr. Examiner, let me point out——

Presiding Examiner: Mr. Goldberg, the objection is sustained and the exhibit is rejected.

(The document heretofore marked Exhibit No. 16 for identification was rejected.)

By Mr. Bury:

Q. Mr. Montgomery, does Edison own any electric facilities outside of the State of California? A. Own any electric facilities? Yes.

Q. What are those facilities? A. The transmission lines from the Hoover power plant.

Q. From the switch yard at Hoover power plant to the state line? A. To the state line.

Q. Are those the only electric facilities owned by Edison outside of the State of California? A. Yes, they are.

Q. Mr. Montgomery, does Southern California Edison Company serve any customers or furnish electric service out-

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side of the State of California? A. We do not.

Mr. Bury: Mr. Examiner, you will recall that the City of Colton offered Exhibit 8 and Exhibit 9, being respectively the certificate of qualification of Edison to do business in the State of Nevada, and its certificate of good standing for the State of Arizona. I would like to have identified at this time, first, a letter dated November 20, 1959, on the letterhead of State of Nevada Public Service Commission, addressed to Southern California Edison Company, to my attention, consisting of two pages and signed "Public Service Commission of Nevada, J. G. Allard, Chairman."

Presiding Examiner: That will be marked Exhibit 17 for identification.

(The document above referred to was marked Exhibit No. 17 for identification.)

Mr. Bury: I have the original of that letter in my possession, and photostatic copies have been distributed.

We would like to offer this letter in evidence, and would like to point out in that connection that by reference to the petition of the City of Colton you will find that they have alleged that Edison was engaged in public service in the State of Nevada, which allegation is denied by Edison's answer. This letter is offered to disprove that allegation in the City of Colton's petition.

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Mr. Goldberg: If it is offered for that purpose, I certainly would object to it, Mr. Examiner. I don't see how it disproves that. I don't know how the state is using this word "public utility".

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I am sure they probably mean to use it, although this is pure speculation, in the sense in which one would be a public utility in the State of Nevada.

The fact that they haven't sought authorization from the Commission to operate as a public utility, nor applied for a certificate of public convenience and necessity, and therefore have no schedule of rates on file with the Commission, does not mean that they are not a public utility within the meaning of the state statutes. This letter doesn't even attempt to answer that.

For example, suppose someone in the State of Nevada wanted service from the facilities traversing the area from this company, this letter doesn't say that the State couldn't order it. It may very well be that because of the fact that they are qualified to do business in the State of Nevada and are doing business in the State of Nevada that they would be required to render service, local service in the State of Nevada. There is nothing in this letter that negatives that.

Mr. Bury: We are faced with the proposition of trying to disprove that allegation. We have developed from the witness the fact that we do not furnish electric service, and

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this letter contains what I believe are facts. I would not expect this Commission to express a legal conclusion.

Mr. Goldberg: I don't know what else this letter is expressing. If it is facts you want to present, you have got your witness here and you say you have presented the facts.

Mr. Bury: These particular letters contain facts in which I could find no other convenient way to present them. I did not want to request a representative of the

Public Service Commission of the State of Nevada to come out and testify to those facts.

Mr. Goldberg: I don't know whether these are facts at all or whether this is an expression of a legal opinion under the laws of the State of Nevada, and if it were, I am interested in knowing the basis for that legal opinion. Incidentally, my attention is called to the fact that this is a letter from the Law Department.

Presiding Examiner: Have you finished with your objection, Mr. Goldberg?

Mr. Goldberg: Yes.

Presiding Examiner: The objection is overruled. Exhibit 17 will be admitted.

(The document heretofore marked for identification as Exhibit No. 17 was received in evidence.)

Mr. Bury: Mr. Examiner, I would like to have identified as an exhibit a letter dated November 24, 1959, on the letter-

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head of Arizona Corporation Commission, consisting of one page, and signed by "Arizona Corporation Commission, S. C. Corbitt, Director, Utilities Division." I have the original copy of that letter here and photostatic copies are being distributed.

Presiding Examiner: It will be marked Exhibit 18 for identification.

(The document above referred to was marked for identification Exhibit No. 18.)

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Mr. Bury: We would like to offer Exhibit 18 in evidence.

Mr. Goldberg: I make the same objection as I did to Exhibit 17.

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Presiding Examiner: The objections are overruled and Exhibit 18 will be admitted.

(The document heretofore marked Exhibit No. 18 for identification was received in evidence.)

Mr. Bury: Excuse me, Mr. Examiner. I think that is all the questions I have of Mr. Montgomery but I wanted to stop for a minute to make a check, to make sure I hadn't overlooked anything.

(Pause.)

Mr. Bury: That is all I have of Mr. Montgomery.

Presiding Examiner: California Commission, do you have any questions?

Mr. Roos: Just one or two questions for clarification at this time, Mr. Examiner.

Cross-Examination

By Mr. Roos:

Q. Referring you to Exhibit No. 13, the map of the distribution facilities, could you tell us—I believe you stated that the lines in black are the distribution facilities of the Southern California Edison Company? A. That is correct.

Q. Could you tell us whether the distribution facilities

of the City of Colton appear anywhere on that map? A. No, they do not.

Q. Referring you to the same map, Mr. Montgomery, directing your attention to the area designated in pink shading, did you testify that that is the distribution area of the Southern California Edison Company out of the Colton substation? A. Supplied from the Colton distribution substation, that is correct.

Q. Would you tell us where the—generally, if you know—where the city limits of the City of Colton would

be designated on this map? Would that be co-extensive with the pink area? A. No, I am sure that is not correct. I don't think the city limits of the City of Colton are shown here and I am not familiar with it in detail enough to point them out.

Q. Referring you again to the portion of the map labelled "Colton substation" at the intersection of the green transmission lines, I note the Derby and the Globe Mills black lines extending from that point on converging at a black square near the words "Colton City" and approximately between two circles, one of which has a "246" and a "248" inside. Is that black square the point at which the City of Colton takes delivery from Southern California Edison Company? A. That is correct.

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Q. Do you know whether Southern California Edison Company serves other customers from the Derby or Globe Mill lines between the Colton substation and the point where the City of Colton takes delivery? A. Yes, we do. The Pacific Fruit Express is served from the Globe Mill circuit, between Colton substation and the Colton City substation, and I believe there are some customers also on the Derby, but I can't specify who they are.

Mr. Bury: Mr. Roos, might I indicate for the record at this point, Mr. Ashley, who will be our next witness, has just recently made a personal inspection of that area and may be able to give you a little more detail if you need it.

Mr. Roos: I see. In that event I have no further questions of this witness at this time, Mr. Examiner.

Presiding Examiner: Thank you, Mr. Roos.

Mr. Everett.

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Mr. Everett: The Staff, Your Honor, wishes to postpone its cross-examination of Mr. Montgomery——

Presiding Examiner: What I meant, is do you have any preliminary questions.

Mr. Everett: Yes, we have one, Your Honor.

By Mr. Everett:

Q. Mr. Montgomery, earlier today we understood Mr. Bury to say that in regard to this energy which Edison Company receives at Hayfield that the payment for that energy was made

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to the United States rather than to M.W.D.

Now, does M.W.D. receive any consideration from that sale even though the actual payment was made, as we understood Mr. Bury to say, to the United States?

Mr. Bury: Excuse me. I would like to object, not too strenuously, except for the use of the word "consideration" in there. Again I think this matter might best be explained by reference to the contracts. Perhaps I can give you a brief explanation and reference if you want it. I am just trying to save time, that is all.

Mr. Everett: We thought the question was appropriate. Can we change the word "consideration" to "benefit" then?

Mr. Bury: No objection.

Mr. Goldberg: I thought you answered. I didn't hear you.

The Witness: I haven't said anything, yet, Mr. Goldberg. I am about to——

Mr. Goldberg: You have me sitting on the edge of my seat.

(Laughter.)

The Witness: The Metropolitan Water District in their agreement with the United States for the alloca-

tion of firm energy that I have previously mentioned agree to take and/or pay for this percentage allocation of their firm energy. Under the 1945 resale contract, in which the District, the United States, the Edison Company, City of Los Angeles, and California

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Electric Power Corporation are parties, and the Reconstruction Finance Corporation, also, the energy is paid for by, in our case, by Edison to the United States, and the U. S. credits it, then, to the Metropolitan Water District under the terms of the contract. That is explained in the contract in much better words than I can say it, sir.

Mr. Goldberg: That is page 78 of Exhibit 14, is that right?

Mr. Everett: Thank you, Mr. Montgomery.

Mr. Goldberg: Exhibit 14, page 78, subparagraph "C" of Section 15, is that right?

The Witness: I will have to have a book, Mr. Goldberg. My book has different page numbers.

Mr. Goldberg: I see. If your counsel will hand it to you, I would like to verify that.

Mr. Everett: Would you please repeat that reference?

Mr. Goldberg: That was page 78 of Exhibit 14, Section 15, Sub "C".

Mr. Everett: Thank you.

The Witness: Yes, that is right. I almost said it word for word.

Mr. Goldberg: Right.

But it is your testimony that that is a sale by the U. S. to Hayfield to Southern California Edison?

The Witness: No, sir. It is a sale at Hoover.

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By Mr. Goldberg:

Q. A sale at Hoover—— A. It is delivered at Hayfield.

Q. I see. A sale at Hoover by the United States? A. Correct.

Q. To Southern California Edison? A. That is right.

Q. All right.

Referring to Exhibit No. 15, is that the actual consumption or is that only connected load, as it says? Exhibit 15 is that letter from the Metropolitan Water District. A. May I have your question again?

Q. Is that the actual loading on the line or is that just the connected load, as it seems to indicate? A. You mean the tabulation in the letter? It is the connected load, as it states, connected load in kilowatts.

Q. The service to the Pacific Fruit Express was it—was that the name of that company? A. That is correct.

Q. At what voltage is that service rendered? A. Well, it is connected to the 12 kv line. I am not sure at what voltage it is metered.

Q. Is it a sale for resale? A. No, sir.

Q. In addition to the sale for resale made to Colton,

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what other sales for resale does Southern California Edison make?

Mr. Bury: I will have to object to that question. I don't think that is relevant here.

Mr. Goldberg: It is quite relevant in view of this witness' insistence that there is no distinction between a sale for resale and a sale in ultimate distribution.

Mr. Bury: I will have to object to that as an unfair summary of his testimony.

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Mr. Goldberg: I don't know what else he said. In response to a question from the Examiner he said he isn't recognizing a difference between the two. If he is recognizing a different (sic), let's hear that.

Presiding Examiner: Will you read both questions to me, Mr. Reporter.

(Questions read.)

Presiding Examiner: The objection is sustained.

By Mr. Goldberg:

Q. Are there any other sales for resale made by Southern California Edison off the Colton, your Colton substation? A. I don't recollect any, Mr. Goldberg.

Q. What was the criteria you used yesterday to distinguish between distribution and transmission? Was it voltage? A. Come again?

Mr. Goldberg: Will the reporter please read it.

(Question read.)

The Witness: I think I recited that the 220 kv backbone was certainly transmission and our 66,000 volt subtransmission system was transmission. And on the single-line diagram that we discussed I indicated that in the light solid lines which showed the 66 kv subtransmission system, I also included the distribution substations of which Colton substation was one, and the Colton substation, as did these other distribution substations, then transformed the voltage down to 16,000, 12,000, 7,000 or 4,000 volts as the case may be in different areas at different locations and that this network of distribution feeders at 16,000 volts, 12,000 volts, 7,000 volts and 4,000 volts, then, which circuits traverse the streets and the alleys and the property lines and serve electric energy to the premises of the customers, constituted the distribution system.

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By Mr. Goldberg:

Q. Is your answer to my question your criterion is voltage? A. I think I have already given the answer.

Q. I am not sure that you have. Can't you answer? A. I gave you exactly the same criteria I used yesterday, sir.

Q. Can't you answer whether it is voltage or not? A. It may not necessarily be voltage.

Q. What is your criteria?

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A. I just gave it to you, sir.

Q. Whether the line traverses alleys or streets? A. And serves the customers, at the customers' premises.

Q. Whether it is a customer for resale or not? A. That is right.

Q. You don't distinguish between resale—— A. Not insofar as distribution system is concerned, sir.

Mr. Goldberg: That is all we have for the time being.

Mr. Everett: No further questions.

Presiding Examiner: Mr. Bury?

Mr. Bury: Do you wish us to proceed now to call our next witness? We have one more.

Presiding Examiner: No. If you are through with Mr. Montgomery——

Mr. Bury: Yes, I have no other questions of Mr. Montgomery.

Presiding Examiner: He may be excused temporarily for further recall for cross-examination.

(Witness temporarily excused.)

Mr. Goldberg: Mr. Examiner, for the sake of the record I think there is a minute or two left I would like to use to ask Mr. Bury whether the company takes the position that Section 6 confers jurisdiction on the State Commission or only that it confers jurisdiction upon the Secretary of the Interior?

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Mr. Bury: Mr. Goldberg, my reply to that, in view of what took place this morning, is that our position will be stated in our briefs. I think we save everyone's time if we wait until then to produce our arguments.

Presiding Examiner: This Court will be in recess until 2 o'clock.

(Whereupon, at 12:24 o'clock p.m., the hearing was recessed, to reconvene at 2:00 o'clock p.m., the same day.)

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AFTERNOON SESSION—2 P.M.

Presiding Examiner: Are you ready, Mr. Bury?

Mr. Bury: Mr. Examiner, I found in checking at Noontime that I had neglected to ask Mr. Montgomery one question which is a matter on which I think there will be no dispute. I wonder if I could have him return to the stand for a second?

Presiding Examiner: Yes, Mr. Bury.

WILLIAM E. MONTGOMERY

resumed the stand as a witness, having been previously duly sworn, and testified further as follows:

Further Direct Examination

By Mr. Bury:

Q. Mr. Montgomery, there has been some testimony concerning Edison's 220 kv line from its Highgrove substation to Hayfield, where it interconnects with the Metropolitan Water District. Would you tell us when that line was constructed and went into service? A. This is the Edison tie-line.

Q. The line owned by Edison between its Highgrove substation and Hayfield? A. The MWD system and the Edison system were parallel to this tie-line for the first

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time on May 8, 1945, and the interconnection was declared officially in service on December 31, 1945.

Q. Excuse me, did you say May 28?

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A. December 28.

Mr. Bury: Thank you. That is the only question I had. They are both December dates, then?

The Witness: That is correct.

Mr. Bury: Thank you.

Presiding Examiner: Thank you, Mr. Montgomery.

(Witness excused.)

Mr. Bury: I would like now to call Mr. Ashley to the stand.

C. L. ASHLEY

was called as a witness, being first duly sworn, and testified as follows:

Direct Examination

By Mr. Bury:

Q. Mr. Ashley, would you state your full name and address for the record, please? A. C. L. Ashley, 601 West 5th Street, Los Angeles, California.

Q. You are employed by Southern California Edison Company? A. Yes.

Q. What is your position? A. Manager of Rates.

Q. Are you in charge of the activities of the Rate Department?

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A. Yes.

Q. Would you state your background, training and experience, please? A. I was graduated in 1926 from the California Institute of Technology with a Bachelor of Science degree in engineering and economics. My engineering major was electrical engineering. Immediately

upon graduation I was employed by the Southern California Edison Company and spent about one year in the initial group of its apprenticeship course for engineering graduates. This training consisted of one month at each of the several of the company's departments.

The following year was spent as the company's representative in a field survey and appraisal of the electrification potential of industries served by the company in southern California.

Upon completion of this survey, six months were spent in the company's San Bernardino district office, working on line extensions and preparing a study relating to territory segregation between the company and the utility now known as the California Electric Power Company.

At the end of 1928, I was transferred to the company's general office in the capacity of assistant to the new business manager, Sales Department, and continued in that assignment for about four years.

In 1932 I received the title of Commercial Engineer,

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Commercial Department, and the responsibility of supervising a consolidated group of rate activities, including filings with the California Public Utilities Commission, correspondence, rate book maintenance, rate application instructions, surveys, analyses and records. In addition, various matters relating to the California Commission's staff were included, such as preparing requested surveys and studies, replying to all informal complaints, and related matters involved in the regulatory procedure.

Beginning in late 1942 I was granted military leave and was assigned to active duty with the U.S. Navy as a commissioned naval reserve officer, specialized, engineering duty. Upon my return to the company in 1945, my responsibilities were expanded to include design of certain of

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the company's tariff schedules, comparisons with other utilities, preparation of revised rules and regulations and studies related to rate simplification and rate zoning.

In May, 1951, a Rate Department was established, and I was appointed to my present position in responsible charge of that department. I am a member of several of the company's committees, including its rate committee. I am a member of the Pacific Coast Electric Association, Incorporated, and have served on several of its committees, including those relating to rates and sales. I am a member of the Rate Research Committee of the Edison Electric Institute and of the

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Load Research Committee of Edison Illuminating Companies. I am registered in California as a professional engineer in electrical engineering. I have testified previously in numerous cases before the Public Utilities Commission of the State of California in hearings relating to Southern California Edison's rates, rules, tariff schedules, and certificates of public convenience and necessity.

Q. As a result of that experience that you have outlined, are you familiar with the history of the various arrangements for electric service which have been in effect between Edison and the City of Colton? A. Yes.

Q. Would you outline briefly the history of that service? A. The City of Colton has no generating facilities and has purchased its entire electric requirements both for resale and for its own use from Edison or its predecessors under arrangements modified from time to time since 1905.

The original 1905 contract called for deliveries not to exceed 300 kilowatts. This contract was followed by contracts in 1908, 1911 and 1913. Commencing in 1923, the

City was billed under a wholesale power rate schedule, and continued under that schedule without a contract until 1937.

In 1937, a contract was entered into which provided for no change in rate. This contract was followed in 1941 by a

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contract which continued the same rate in effect, but provided a reduction in billing by the adoption of a power factor discount. The 1941 contract had a term of ten years. In 1945, Edison, as a part of its program of general reduction in rates, entered into a written contract with the City of Colton, dated October 1, 1945, which effected a reduction of rates thereto for being charged to the City, and gave recognition to the growth of the City's electric requirements.

At or about this time, Edison entered into other contracts for resale service containing similar rates. After the execution of the Colton contract in October of 1945, Edison filed Application No. 27108 with the California Railroad Commission for authority to carry out the terms of that contract. That Commission's decision No. 38461, issued December 10, 1945, granted the authority requested.

Mr. Goldberg: Mr. Examiner, in an early portion of the answer of the witness he referred to the purchase by the City of Colton of electric energy from Southern California Edison for resale and for its own use. Now, I move to strike that interpretation by the witness that there was a purchase by Colton of energy for its own use.

Additionally, I move to strike the witness's answer as immaterial and irrelevant to any issue in this proceeding the references to an application to the California Commission, and an opinion and order of the California Commission on that

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application.

Presiding Examiner: The objection is overruled.

By Mr. Bury:

Q. Mr. Ashley, I will show you a document captioned "Before the Railroad Commission of the State of California; in the matter of the application of Southern California Edison Company, et cetera, Application No. 27108", and ask you if this is a true and correct copy of the application for authority to perform the contract with the City of Colton to which you have referred. A. Yes, it is a true and correct copy of the application. However, a copy of the contract of October 1, 1945, referred to in the application as Exhibit "A", is not attached.

Q. Is Exhibit 5 in this proceeding the same document which is referred to as Exhibit "A" in that application? A. Yes, it is.

Mr. Bury: At this point may we have that document marked for identification?

Presiding Examiner: It will be marked Exhibit No. 19, for identification.

(The document above referred to was marked for identification as Exhibit No. 19.)

By Mr. Bury:

Q. I show you the document captioned "Decision No. 38461, Before the Railroad Commission of the State of Cali-

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fornia, in the matter of Southern California Edison Company, et cetera, Application No. 27108", and I ask you if that is a true and correct copy of the decision of the California Commission to which you referred. A. Yes, it is.

Mr. Bury: May we have that document identified as an exhibit, please?

Presiding Examiner: It will be marked Exhibit 20 for identification.

(The document above referred to was marked for identification as Exhibit No. 20.)

By Mr. Bury:

Q. Following the issuance of Decision No. 38461, Exhibit 20 for identification, did Edison proceed to charge the City of Colton for service at rates set forth on pages 2 and 3 of Exhibit 5? A. Yes.

Q. Would you describe generally the type of electric service furnished within the City of Colton?

Mr. Goldberg: By whom; by Southern California Edison?

Mr. Bury: We will let the witness answer the question if he understands it.

Mr. Goldberg: Mr. Examiner, I think we are entitled to know. We have service in the City by the City of Colton, we know that. Now, is this a request that he describe that serv-

ice or some other service?

Mr. Bury: The question to the witness was: would you describe generally the type of electric service furnished within the City of Colton?

I intended by that question to cover electric service by anyone within the City of Colton.

The Witness: The City of Colton operates a municipal electric distribution system and takes delivery from Edison of its requirements for this system at the City of Colton substation. The delivery is at 4 kv. The city uses some portion of the energy delivered at this plant for its

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own use in lighting streets and municipal buildings and other incidental uses, as well as for sale to its electric customers.

By Mr. Bury:

Q. Does Edison also furnish electric service to consumers in the City of Colton? A. Yes. To an extent, the local distribution facilities owned and operated by Colton are paralleled within the city boundaries of Colton by Edison's own distribution facilities, inasmuch as Edison directly serves other customers located within the City of Colton.

In addition to the City of Colton, Edison had as of December 1958, 78 customers in the City of Colton, which include 53 domestic, 15 commercial, nine industrial and one agricultural pumping account.

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In addition to resale service to Colton, Edison also furnishes electric service to water pumps at several city-owned wells. These retail pumping accounts are served from Edison distribution circuits.

Q. Mr. Ashley, how were the rates which appear on pages two and three of Exhibit 5 applied to the various electric service requirements of the city of Colton? A. The various accounts, both for resale and pumping, were conjunctively billed; that is to say, a combination of the quantities of energy and demands of the resale and retail pumping accounts were combined into single quantities for the purpose of billing as if the bill were for a single meter or service.

Specifically, the kilowatt hour consumption at each of the locations were totaled, and by an inspection of the recording demand meter charts for each of the several delivery points, the highest coincident demand for the billing period was determined.

Mr. Goldberg: May I ask, was that last answer related to a particular period of time?

Mr. Bury: Mr. Goldberg, I think you will find the record shows that I—this is one of a series of questions which started following the issuance of decision 38461.

Mr. Goldberg: In other words, this answer is following the issuance of that decision describing what happened?

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Mr. Bury: That is right.

Mr. Goldberg: All right.

By Mr. Bury:

Q. Does the written agreement of October 1, 1945, which is Exhibit 5, provide by its terms for conjunctive billing in the manner you have outlined? A. No, it does not.

Q. Why was this done? A. There had developed by this time a general conjunctive billing practice where we were dealing with public agencies or municipalities, and particularly where pumping and street lighting service was involved. In many instances, as was the case with Colton, meter readings of several accounts were combined, although this practice was not expressly recognized either in the contract or the applicable rules and rate schedules.

Q. For what period of time following the authorization of the 1945 contract did Edison continue to charge the rates which appear at pages 2 and 3 of Exhibit 5? A. Such rates continued in effect until changed by the California Public Utilities Commission in its Decision No. 50449, dated August 17, 1954, in Application No. 33952. That decision required Edison to file a revised tariff schedule——

Mr. Goldberg: I object, Mr. Examiner.

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Mr. Bury: Let the witness complete the answer, please, and then we can hear the objection.

Mr. Goldberg: One of the difficulties I am facing here is that the answers are going far beyond the scope of your question. Your question calls for certain information and he gives it and then he proceeds to launch into something else which is entirely beyond it. Now, by that device, whether deliberate or otherwise—I am not suggesting that it is—I can't be precluded from objecting to that portion of the answer. I object to any further response, because he has responded to the question.

Presiding Examiner: Will you read the question to me, Mr. Reporter?

(Question read.)

Presiding Examiner: And the answer.

(Answer read.)

Presiding Examiner: Objection will be sustained to that part of the witness' answer, beginning with "that decision required", etc.

Now, Mr. Bury, I don't mean to preclude you from asking the witness what that decision required of Southern California Edison.

Mr. Bury: I appreciate that.

Presiding Examiner: We will get to that, then, as we come to it.

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By Mr. Bury:

Q. What did that decision to which you have referred provide with reference to service to the City of Colton?

Mr. Goldberg: Mr. Examiner, I would object if this testimony is intended to support the contention of the company that the purported exercise of jurisdiction with respect to the sale by Edison to Colton has any bearing

on the issues to be decided in this case. If we are only engaged here in getting some historical pattern of facts and we are getting that only for that purpose, I don't know that I would object to it. That would depend upon how far he is going to go in a description of the requirements of that decision.

Mr. Bury: We certainly are trying to develop here the pattern or the history of what has occurred. I certainly do not expect this witness to testify as to the legal effect or even comment in any manner upon the legal effect of what the California Commission did.

Mr. Goldberg: You misunderstand me.

Is it the purpose of counsel to argue from this presentation of facts; is it his intention in putting it in to be able to argue from this recitation of facts that the Federal Power Commission cannot have jurisdiction in the premises? Because if that is his intention, then I do object.

Mr. Bury: I do not believe it is incumbent upon me to state for what purposes I may rely on this particular evidence.

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I think, however, that counsel is well aware of some of the arguments that will be made, some of the legal arguments that will be made at the conclusion of this case. I think the practical matter is that this is some factual matters and some history that we need in the record for a consideration of this case.

Mr. Goldberg: Mr. Examiner, we are entitled to know the purpose for which it is offered. That is the whole basis for ruling on whether evidence is or is not material.

Now, this——

Mr. Bury: The issue is whether or not it is relevant to any of the issues of this proceeding, not what I say I

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want to use it for. The issue is is it relevant to the issues in the proceeding?

Mr. Goldberg: No, not at all. How you want to use it, how you are proposing to put it in in that connection, is material to a ruling on whether that evidence may be admitted.

If you are asking these questions for the purposes of eliciting facts for the purpose of being able to argue that the Federal Power Commission has no jurisdiction in view of the purported exercise of jurisdiction by the California Commission, then we certainly do object because the law is well established that even unchallenged jurisdiction by a state commission over a period of years has no bearing on the issue of the Federal Power Commission's jurisdiction.

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Mr. Bury: Certainly as I interpret these arguments there is an issue here as to whether or not what the California Commission has done is, might we say, de facto or de jure. I am sure all of the law on that subject will be argued.

Mr. Goldberg: There is no issue there.

Mr. Bury: I think it is pertinent to this proceeding to know what has occurred.

Mr. Goldberg: If you are going to limit your use of it, that is one thing. But if you are putting it in here for a different purpose which is not material or relevant, we object.

Presiding Examiner: Mr. Bury, what is the date of the California Commission Order that the witness is now testifying about?

Mr. Bury: I believe his answer was that that particular Order about which he just testified is August 17, 1954.

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Presiding Examiner: Do you wish to be heard, Mr. Everett?

Mr. Everett: Yes, Mr. Examiner. Couldn't the witness tell the story of the rates here by designating the period of time in which they are in effect, by certain dates rather than having to make reference to a decision of the State Commission? The important thing as we understand——

Mr. Bury: I mean, after all, all of us prepare our cases in our own way. I thought this was the most helpful way to put it in. We do appreciate that the decisions which we intend to offer are somewhat bulky, but we do intend to make specific

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reference only to those portions which contain statements which we think are pertinent to this proceeding.

Mr. Roos: Mr. Examiner, the California Commission feels that its decisions construing this contract, 1945 contract, and its rate schedules, the rate schedules which it has ordered Edison to file with it subsequent to the date of this contract are material to this hearing, if for no other purpose than to show that at all times there has been local regulation in California of this sale to the City of Colton, and that, coupled with the sale to Edison of Hoover power, which is power sold by the U. S. Government, the two matters construed together show that there is no existence of the so-called Attleboro gap, which was referred to by Staff counsel this morning.

For this reason the California Commission feels that its decisions are of vital importance and materiality to these proceedings.

Presiding Examiner: On the matter referred to in the Petitioner's complaint filed with the Federal Power Commission, the objection is overruled.

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Mr. Bury: The pending question is a way back. Perhaps I can rephrase it.

By Mr. Bury:

Q. What did Decision No. 50449 to which you referred specify with respect to Edison's service to Colton?

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A. That decision required Edison to file a revised tariff schedule designated Schedule "R" to be applicable to electric service to Colton under the 1945 contract from and after September 13, 1954. That decision also required the termination of the practice of conjunctive billing and required that thereafter the various pumping accounts of the City of Colton be billed under the applicable rate schedules authorized by that decision.

Q. Mr. Ashley, I show you a document which is bound in a green cover bearing the caption "Southern California Edison Company, Decision No. 50449 (August 7, 1954) before the Public Utilities Commission of the State of California" and ask you if that is the document which contains a true and correct copy of Decision No. 50449 of the California Commission to which you have just referred? A. Yes, it is.

Mr. Bury: May that be identified as an exhibit, please.

Presiding Examiner: It will be marked Exhibit 21 for identification.

(The document above referred to was marked Exhibit No. 21 for identification.)

By Mr. Bury:

Q. Mr. Ashley, for our convenience could you designate the specific portions of Exhibit 21 for identification which relate to the subject of service to the City of Colton?

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A. Pages 69 through 87 of the Opinion and Order and pages 21, 22, 23, 24, 25, 31, 32, 36 and 37 of Appendix "A".

Mr. Goldberg: I lost you after 25. Twenty-two, 23, 24, 25, 31——

The Witness: Thirty-two, 36 and 37 of Appendix "A".

By Mr. Bury:

Q. In what manner was electric service to the City of Colton billed after the effective date of the Decision No. 50449 which is Exhibit 21? A. For the delivery for resale at City of Colton substation Schedule "R" was applied, Schedule "PA-1" was applied to four of the five pumping accounts, and the fifth account was billed under Schedule "PM."

In accordance with its provisions Schedule PM expired on October 1, '56, and thereafter Schedule PA-2 was applied to this account.

Q. Did the City of Colton continue to pay bills presented for electric service billed in the manner you have just outlined? A. Yes.

Q. Was any protest made by Colton to the payment of such bills? A. No.

Q. If such protest had been made would it have come to your attention?

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A. Yes, I am sure.

Q. When were the rates charged to the City of Colton for electric service next changed? A. After the California Commission issued its Decision No. 55703 dated October 15, 1957, in Application No. 38382-Amended; that decision required Edison to file a revised Schedule R to be applicable to electric service under the Colton contract

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from and after November 9, 1957. Such modified rates have been charged and collected by Edison since that date.

Mr. Goldberg: May it be understood, Mr. Examiner, that we have a continuing objection to this whole line of questions.

Presiding Examiner: It will be so noted.

By Mr. Bury:

Q. Mr. Ashley, I show you a document with a green cover which bears the caption "Southern California Edison Company, Decision No. 55703 (October 15, 1957) before the Public Utilities Commission of the State of California" and ask you if that is the decision to which you just referred? A. Yes.

Mr. Bury: May we have that identified, please?

Presiding Examiner: It will be marked Exhibit 22 for identification.

(The document above referred to was marked Exhibit No. 22 for identification.)

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By Mr. Bury:

Q. Mr. Ashley, for our convenience would you designate the specific portions of Exhibit 22 for identification which relate to or comment on the subject of service to the City of Colton? A. Pages 24, 26, 31, 41 through 44, 49 through 52 of the Opinion and Order, and pages 6, 7 and 8 of Appendix "A".

Q. Has the City of Colton made any protest to the payment of bills presented by Edison since November of 1957? A. It was brought to my attention that after the revised rates went into effect the stubs of the bills as well as the City's check bore the notation "Paid under protest." It is my understanding that it has been the general practice of the City to so mark the stubs of its bills

and its checks since that time, although there have been some occasions when the notation did not appear.

Q. Mr. Ashley, I will show you Exhibit 7 and ask you if that is a copy of a check and stubs bearing the type of notation to which you have referred? A. Yes, it is.

Q. Mr. Ashley, to your knowledge were the bill stubs and checks received from the City of Colton bearing such notation ever accompanied by any explanation of the reasons for such notation being placed thereon? A. No.

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Mr. Bury: We would like to offer in evidence at this time Exhibits 19, 20, 21 and 22.

Mr. Goldberg: All of Exhibit 21 and all of Exhibit 22, is that what you are saying?

Mr. Bury: I believe that all of the exhibit should come in, if it is to be understood. We have made a specification of the portions thereof which we believe, as the witness testified, to comment on the subject of service to the City of Colton. Perhaps those are the most relevant portions of those exhibits. However, the portions referred to which are particularly relevant to this proceeding we believe cannot be fully understood without the balance of the exhibit so that those matters are put in context; the portions to which we have specifically referred.

Mr. Goldberg: Mr. Examiner, we object to the introduction in evidence of Exhibits 19, 20, 21 and 22, in any part. As we have said before, the question of the Federal Power Commission's jurisdiction is in no way dependent upon the exercise or lack of exercise of purported jurisdiction by a state commission. That is not open to debate, that is settled as a matter of law, settled in that case I referred to just the other day where almost in the same connection the Examiner sustained one of my objections to oral testimony.

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We have in the record anything that is necessary, if counsel wants to pursue that subject, namely the testimony of

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the witness that the California Commission purported to act on these rates and that they took such action as they did pursuant to the California Commission's purported exercise of jurisdiction. We don't need to clutter up this record with—here is one document with four appendices, A, B, C and D, and an 87-page opinion that by the witness' own testimony does not have any bearing, in all respects, on the issues they are purporting to raise.

For example, he mentioned only pages 69 to 87 as bearing on the subject of his testimony. And looking at those pages I am unable to see how even parts of those pages could conceivably be construed as bearing on any issue they want to raise with respect to the City of Colton. For example, page 72 we have a discussion of rate schedules relating to agricultural power, and I haven't heard that there is any such thing involved in the sale to Colton. Then there is heating and power, PH rate schedules, and I am not aware of anything that is involved in this proceeding in their contentions relating to that. Standby service, oil field power and light at page 78, I don't understand that that has anything to do with the issues, even under their contentions.

Page 79, Vernon rates, page 80, railway service, I don't know how the witness was able to say that has any bearing on it in his designations.

Mr. Bury: Mr. Goldberg commented on portions of that

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decision under the caption "Agricultural power." I think he will find in the subheading of that opinion a dis-

cussion of Schedules PA-1 and PA-2, to which the witness had testified for some periods of time have been used in billing certain service to the City of Colton. I think you will find on each page or a portion of a page cited a discussion of some material relating to service to the City of Colton.

Mr. Goldberg: Well, here, under "Agricultural power" it is true that on page 73, for example, there is a reference to Schedules PA-1 and PA-2, but that reference to Schedules PA-1 and PA-2 is not in respect of the Colton sale. It bears on some other use of power which perhaps falls under those rate schedules and may be a perfectly proper application of that rate schedule to a purely local sale. And it goes on to talk about such schedule which supersedes existing schedules, PAP-2. I don't understand that there has ever been involved any such schedule in the sale to the City of Colton. That is what we get into, Mr. Examiner, if we are going to permit any part of it to come in, we just fill up the record with things that have absolutely no bearing on what we are talking about. But more important than that, we pursue our basic objection that none of this is material or relevant to the issues to be decided.

Mr. Bury: May we have a ruling on the offer, please?

Mr. Everett: May Staff make a comment, Your Honor.

Presiding Examiner: Mr. Everett.

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Mr. Everett: As the Staff views the situation it is a question of simply whether the Edison Company's wholesale service to the City of Colton is subject to the jurisdiction of the Federal Power Commission, and any facts which will show whether the company owns and operates facilities for the transmission and sale at wholesale of

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energy in interstate commerce will aid in the solving of that question, but these exhibits which are now being offered by Mr. Bury, Nos. 19 through 22, do not, it appears to the Staff, relate to that question, and therefore they should not be admitted in evidence.

Presiding Examiner: Exhibits 19, 20, 21 and 22 certainly have no bearing upon whether there was a sale at wholesale for resale in interstate commerce. To that extent they are irrelevant to the issues in this case.

However, the City of Colton in their Exhibit No. 6 have asked that if this Commission finds that there was a sale in interstate commerce by Edison to the City of Colton for resale, then they ask that they be entitled to recover the excess charges with interest at the rate of 6 per cent.

To the extent of determining if there were excess charges, and what those excess charges were, then Exhibits 19, 20, 21 and 22 are relevant and they will be admitted at this time.

Mr. Goldberg: For that purpose?

Presiding Examiner: For that purpose.

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(The documents heretofore marked Exhibits 19, 20, 21 and 22 for identification were received in evidence.)

Mr. Bury: Excuse me. We have misplaced something somewhere along the line.

Presiding Examiner: Off the record.

(Discussion off the record.)

Presiding Examiner: On the record.

By Mr. Bury:

Q. Mr. Ashley, I show you a document entitled "Southern California Edison Company sales and revenue data, comparison of Edison records and reports with City of Colton reports, 1954-1958" and ask you if that is an

exhibit prepared by you or under your supervision? A. Yes, it is.

Q. Mr. Ashley, have you seen Exhibit 4? A. Yes, I have.

Q. Had you previously been advised that the information contained in the FPC annual report filed by the City of Colton, covering kilowatt hours purchased and costs, do not agree with the information filed by Edison in its Form 1 annual report for kilowatt hour sales to and revenues from the City of Colton? A. Yes.

Q. Is the document I have handed you an exhibit which endeavors to reconcile those differences? A. Yes, it is.

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Mr. Bury: May we have that identified, please?

Presiding Examiner: It will be marked Exhibit 23 for identification.

(The document above referred to was marked Exhibit No. 23 for identification.)

By Mr. Bury:

Q. Mr. Ashley, will you tell us what Exhibit 23 shows? A. Page 1 of the exhibit shows kilowatt hour sales to the City of Colton for the years 1954 through 1958. The first line refers to Account No. 695-4505 which is identified on page 3 as deliveries by Edison to Colton at City of Colton substation for resale. The figures shown on that first line represent the kilowatt hour sales made to that account in each year.

The second line, which is entitled "Edison Form 1 Report" you will note shows the same kilowatt hour figures for each year. That is because Edison reports in Form No. 1 under "Sales to other electric utilities, Account 605", only the sales to the City of Colton which are made for resale at the City of Colton substation.

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Immediately below that are shown by account numbers the kilowatt hour sales under each of the five retail pumping accounts of the City of Colton. As shown in footnote "A" for the year 1954 the energy is for the period 9-13-54 to the end of the year, reflecting the termination of conjunctive billing

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at that time.

There then follows a line entitled "Total six accounts" which represents the total kilowatt-hours sales by Edison to Colton both as reported by Edison in Form 1 for resale service plus the five retail pumping accounts.

The next line entitled "Colton Report" reflects the kilowatt hours purchased as reported by Colton for each of the years. The next line, which indicates the difference, shows substantial variation between the kilowatt-hour sales as reflected by Edison records and the kilowatt hours purchased as reported by the City of Colton.

In the lower portion of the page there is shown a similar tabulation of the kilowatt-hour sales by Edison to Colton under each of the six accounts, but in this case those sales are shown for the 12 months periods ending January 31 of each year. It will be noted that the total kilowatt-hour sales for these periods are for all practical purposes reconciled with the kilowatt-hour purchases reported by the City of Colton for the calendar years.

On page 2 is shown the revenues from sales to the City of Colton for the years 1954 through 1958. Again, at the top of the page reference is made to the account number for deliveries to the City of Colton substation for resale and these are the same revenues reported by Edison in Form 1 under Account 605 Sales to Other Electric Utilities as shown on the

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second line.

In the center of the page there is set forth the revenues from each of the five retail pumping accounts by years. It will be noted that when the revenues from all six accounts, as reflected by Edison records, are totaled there is again for all practical purposes a reconciliation of Colton's reported costs.

At the bottom of the page the total revenues from all six accounts shown for the 12-month periods ending July 31 are compared and the Colton Report——

Q. I think you misspoke yourself. A. I think so.

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Q. What is shown at the bottom of the page, page two? A. The total revenues from all six accounts. These are shown for the 12 months period ending January 31. These are compared with the Colton report simply to illustrate that they could not be reconciled for periods other than the calendar year, as was done for sales on page one.

Q. Mr. Ashley, what is shown on page three and the following pages of Exhibit 23? A. Page 3 contains an identification of each of the accounts by describing service location, service voltage, type of service, circuits serving the account, and also the rates applied during the time periods indicated. On page 4 is a map of the City of Colton and vicinity, which is a portion of the map referred to by Mr. Montgomery in his testimony and identified as Exhibit No. 13. The map indicates, by account numbers, each point at which electric service is furnished to the City of Colton, and certain of Edison's distribution circuits supplying that service.

That map's shaded area represents the present incorporated area of the City of Colton. On pages five through

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12 of the exhibit appear copies of the rate schedules referred to on page three as being applied to the various accounts.

Q. Mr. Ashley, what conclusions do you draw from the comparison of sales and revenue data shown in Exhibit 23? A. Edison reports in Form 1 under Account 605, as

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sales to other electric utilities only the revenues from sale for resale to the City of Colton. Colton apparently reports as the cost of energy not only the energy purchased from Edison for resale delivered at City of Colton substation, but also the cost of energy delivered to each of its five pumping plants. The kilowatt-hour sales reported by Edison in Form 1 are reported for the same month for which the revenues attributable thereto are reported. The City of Colton apparently reports kilowatt-hours purchased for a period one month prior to the period for which they report the cost of energy purchases. In other words, Colton may be reporting kilowatt-hours purchased in the month received and the cost thereof in the month paid.

Q. Mr. Ashley, you have referred in your testimony to two rate proceedings in which Edison was involved before the California Public Utilities Commission in 1954 and 1957, respectively. Did you actively participate in the conduct of those proceedings? A. Yes.

Q. Did you attend all portions of those proceedings in which representatives of the City of Colton participated? A. Yes——

Mr. Goldberg: I object to that question, immaterial and irrelevant, whether they were there or weren't there, what part they took in the case is beside the point.

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Presiding Examiner: What relevancy does it have, Mr. Bury?

Mr. Bury: Well, this, of course, is just a preliminary question. We will get to this issue sooner or later, we might as well do it now. We intend from this point forward to outline in certain respects the participation of Colton in the rate proceedings before the California Commission, again, in another respect a lack of participation or failure to seek judicial review of those orders. We believe this line of testimony and some exhibits which will follow are particularly relevant to some of the issues that are involved in this proceeding.

As we have noted in our motion to dismiss and, again, in our opening statement, we believe that one of the legal problems involved in this proceeding is the application of the doctrine of res judicata. We believe we can establish that Colton is bound by the P.U.C.; that is, the California Commission, determination of facts on which jurisdiction are based.

Now, it is our theory of this case, and we believe correctly, that we are not here engaged in a proceeding initiated by the Federal Power Commission by an order to show cause or order of investigation, despite Colton's characterization of the notice of hearing. Here Colton is the moving party, and we believe that we can prove that they are bound by prior P.U.C.

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action because of their participation and because of their failure to raise the issue of jurisdiction necessarily before the California Commission.

May I continue?

Presiding Examiner: Yes.

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Mr. Bury: Secondly, we believe this line of testimony and the exhibits will be relevant on the issue of estoppel. We believe the orders of the P.U.C. and Colton's participation in those proceedings prove that Colton's every act gave recognition and support to P.U.C. jurisdiction. And Edison perpetuated the 1945 contract after its initial term in reliance on that position taken by Colton.

We believe this evidence will demonstrate that Colton is barred at this late date from reversing its field because finally, after 46 years of California regulation, that Commission finally prescribed rates which dissatisfied Colton. We think this past conduct by Colton is just as obviously binding upon it as was the action of the Wisconsin-Michigan Power Company in the case which Mr. Goldberg likes to cite, where in that case the company—there had been a determination by this Commission that it had jurisdiction, to which that company did not take exception or seek review, and submitted to that jurisdiction and affirmatively recognized it for a very considerable period of time. Then finally, when it sought some rate treatment and was dissatisfied with the

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Federal Power Commission action, it left that bailiwick and went to the State. The Court, in ruling in that case, makes the statement that it believes that that conduct in itself should be conclusive. That particular citation is at 197 Federal 2nd 472, at page 475.

Mr. Roos: I might say——

Mr. Bury: I have one other point I would like to make.

Furthermore, we believe that the orders of the Public Utility Commission and the Colton participation in those proceedings is necessary and relevant to an interpretation of the contract which is introduced in evidence as

Exhibit 5 in this proceeding. That contract, on its last page, provides that this "contract shall at all times be subject to such changes or modifications by the Railroad Commission of the State of California as said Railroad Commission may from time to time direct in the exercise of its jurisdiction."

We think that this evidence will prove that Colton interpreted, as did Edison, this contract as one whose rates were subject to change. We will show what revised rates were applied under the contract, both sale for resale and separate deliveries for consumptive use at the City's pumping plants.

Mr. Goldberg: If I may make inquiry as to the intention of the company, assuming all you say is true with respect to the doctrines of res judicata and estoppel, this sale, even though the evidence shows (sic) is a sale for resale in interstate

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commerce, the Federal Power Commission has no jurisdiction? Is that the contention of Southern California Edison?

Mr. Bury: I am saying in this case the Commission has not seen fit to issue an order to show cause or an order of investigation. As I said, no matter how you tried to characterize that notice of hearing. This is a complaint proceeding, Colton is the moving party, and it may be foreclosed both on the doctrine of res judicata and on the doctrine of estoppel. This evidence we believe is relevant, not only to precluding Colton from moving forward at this time, but certainly to a subsidiary question of the liability, if any, for excess charges claimed by Colton.

Mr. Goldberg: Mr. Examiner, the arguments of counsel would not be valid even if these were to be construed

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as complaint proceedings. But let me point out to the Examiner that the Commission's order in paragraph (a) of the order issued August 28, 1959, states that pursuant to the authority contained in and subject to the jurisdiction conferred upon the Federal Power Commission by the Federal Power Act, particularly Sections 205, 301, 306, 307—I emphasize 307—308 and 309 thereof, and the Commission's rules of practice and procedure, a public hearing shall be held respecting the matters involved and the issues presented in this proceeding. The balance isn't necessary, as to the time and place.

Now, notice two things about that paragraph: First, the

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reference to Section 307. Now, 307 is the section of the Federal Power Act which authorizes the Commission to investigate facts, conditions, practices or matters which it may find necessary or proper in order to determine whether any person violates or is about to violate any provisions of the Act, and so on.

Notice, second, that the Commission says that we are to have a hearing on the matters involved in and the issues presented in this proceeding. It isn't limited to issues presented by any particular pieces of paper filed by any parties to the proceeding.

This is an investigation and there is simply no getting away from it. But I say, even if you were to construe it as a proceeding on a complaint, the arguments would not be valid. To begin with, it is so well established that the principle of res judicata has absolutely no place in administrative proceedings. Secondly, as far as estoppel is concerned, nothing that the California Commission can do, nothing that the California Edison Company can do, nothing that we can do, can amend the Federal Power Act

or estop the Federal Power Commission from asserting the jurisdiction conferred upon it under the Act.

Now, counsel refers to Wisconsin-Michigan Power Company, and he quotes from it with such relish, I hate to deny it to him.

There are, in addition, other cases that he might be well-

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advised to read, including Wisconsin Power and Light, where you had no such fact as to the one to which he refers, of a submission to Federal Power Commission jurisdiction and then not liking the treatment by that tribunal and going elsewhere.

Incidentally, I might point out in that connection that it makes no difference what may be the spark that initiates an investigation. Whatever may start it, whatever moves us or Southern California Edison to do something, the fact remains that the determination turns upon the facts in the proceeding, not motive.

But in that Wisconsin Power and Light case there was a long, continued exercise of jurisdiction by the Wisconsin Commission, and the Court there dismisses the proposition that that long, continued exercise of jurisdiction by the Commission could in any way have any bearing on the Federal Power Commission's jurisdiction under the Federal Power Act.

I might point out that I am not aware that in any of the proceedings before the California Commission was there any contest on this matter of jurisdiction. There there was a decision by the California Commission, in which they assumed that they had jurisdiction. They never addressed themselves to the problem.

I might point out in that California Electric Power Company case there was a hearing before the California Com-

mission in which they prescribed new rates, which the Navy didn't like, and the Navy participated in that proceeding, and because they didn't like those rates, the Mineral County of Nevada didn't like them, that is how you got that proceeding started.

Presiding Examiner: Does counsel for the California Commission wish to be heard?

Mr. Roos: I don't feel that the issues are quite so simple as Mr. Goldberg seems to feel they are. As I understand Mr. Goldberg's argument, he feels that once interstate sales at wholesale are established, that then all other issues fall by the wayside.

But calling the Examiner's attention to Section 201 of Part 2 of the Federal Power Act, the last part of the section states, "such Federal regulation, however, to extend only to those matters which are not subject to regulation by the States."

Now, the California Commission subscribes to the views expressed by Mr. Bury, and we feel that all possible defenses available to Southern California Edison should be permitted them at this time.

Presiding Examiner: Mr. Roos, let me say to you that this Examiner and this Commission have great respect for the California Commission, and that Southern California Edison certainly will get—be permitted to avail themselves of all

legal defenses that they may have in this particular courtroom.

Mr. Everett?

Mr. Everett: Mr. Examiner, the staff wishes to renew its objection to testimony and exhibits relating to the proceedings before the California Commission, because as

indicated previously, it is the staff's position that nothing that the California Commission did and nothing that the Edison Company did or did not do, or the City of Colton did or did not do before the California Commission can deprive the Federal Power Commission of jurisdiction over this wholesale electric service by Edison Company to the City, if the facts in this case show that there is such jurisdiction, as we believe that there is.

Presiding Examiner: Does anybody else wish to be heard?

Mr. Bury: Just one sentence. As I said, this is part of a very vital defense we think that we have, and we wish to present the evidence.

This is a little bit preliminary because we are really just at the first question, but I have tried to outline the way we wish to proceed so that we could anticipate it at this time. I think it will not take us very long for us to put this small amount of evidence that we have on.

Presiding Examiner: Mr. Bury, it is the judgment of this Examiner that evidence of what occurred before the California

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Commission has no bearing upon the issues of whether or not this was a sale for resale in interstate commerce.

Mr. Bury: I believe there are other issues in this case besides that one.

Presiding Examiner: Well, if the Federal Power Commission has jurisdiction, which it hasn't asserted, and the California Commission did assert jurisdiction, in the absence of the Federal Power Commission's jurisdiction, that didn't oust the Federal Power Commission of jurisdiction.

Mr. Bury: We are not taking the position that there is any res judicata or estoppel as to the Commission. We

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are offering this evidence only as to its effect on the City of Colton. I believe there is a vital distinction there, particularly under the type of prayer for relief that has been made in this petition. There are some equities in this case and we hope to establish them through this evidence.

Presiding Examiner: We will take the afternoon recess.

(Whereupon, at 3:15 p.m., a recess was taken to 3:30 p.m.)

Presiding Examiner: Are you ready, Mr. Bury?

Mr. Bury: Yes; as I believe, at the time we stopped the questions and answers, Mr. Ashley had previously testified that there had been two rate proceedings in which Edison was involved before the California Public Utilities Commission in 1954 and 1957, he testified that he participated in those proceedings, and the question pending at that time was:

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"Did you attend all portions of those proceedings in which representatives of the City of Colton participated?"

Mr. Goldberg: That was the pending question, was it not?

Presiding Examiner: And there was an objection to that question.

Mr. Bury: Yes.

The Presiding Examiner: The objection is sustained.

Mr. Bury: Your Honor, we propose, or had proposed, to develop at this time, after an affirmative answer from the witness at this time showing or laying a foundation for his familiarity with those proceedings, and then wished to proceed to identify and offer in evidence two items or two exhibits. If the objection will run to the introduction of those exhibits, and the objection is sus-

tained, we would like to make an offer of proof in that respect. And I would think that perhaps the most convenient way to handle it is to let me proceed with questions and answers, and we can, if the City of Colton wishes to object, let them merely state objection and we will understand that it is on the same grounds that we have argued here previously, and we would reply on the same lines that we had replied previously.

Presiding Examiner: So that you will understand my thinking on it, I would be inclined to sustain objections to testimony to the res judicata and estoppel questions raised.

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Now, what the proceedings were before the California Commission, this Examiner doesn't see that they are competent, relevant or material to the issues in this case. So just to put you on notice, I would be inclined to sustain objection to that. Now, I did admit, as you know, and I said at the time that I admitted your exhibits 19, 20, 21 and 22, that I admitted them for the purpose of determining liability on the part of Edison, if there be liability, rather than their relevancy as to the issues before the California Commission.

Mr. Bury: Certainly I would think that the material we intend to present now is material to those issues, as well.

Presiding Examiner: You may proceed, then.

Mr. Goldberg: We don't agree, of course.

Presiding Examiner: Well, you make your objection, Mr. Goldberg, and I will rule on them as we go along.

Mr. Goldberg: All right.

Mr. Bury: Mr. Examiner, I have handed the witness a document which bears the caption "Copy, Before the Public Utilities Commission of the State of California",

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in the matter of the application of Southern California Edison, et cetera, Application No. 33952, Reporter's Statement, under date of May 3, 1954. It consists of that cover page and two pages, the second of which is headed "Excerpts from oral argument of John W. Holmes, counsel for the City of Colton,

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and others", commencing at 7924. We would like to have this identified as an exhibit.

Presiding Examiner: It will be marked Exhibit 24, for identification.

(The document above referred to was marked for identification as Exhibit No. 24.)

Mr. Bury: For your information, this is the same document which was attached, I believe, as Exhibit "A", to Edison's motion to dismiss herein, which has been served on all parties. We do have additional copies of Exhibit 24. I believe they have been distributed.

By Mr. Bury:

Q. Mr. Ashley, is Exhibit 24 for identification a true and correct copy of that portion of the proceedings before the California Commission at the time indicated on the cover of Exhibit 24? A. Yes.

Mr. Bury: We would like to offer Exhibit 24 in evidence at this time.

Mr. Goldberg: Mr. Examiner, we object to it and we would point out that it is obvious from the contents of it that it can not possibly have any relevance to the question of the determination of the amount of difference involved in the period.

Mr. Everett: Mr. Examiner, the staff must object to the

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admission in evidence of this Exhibit 24 on the ground that it does relate to testimony before the California Commission, and as the Staff has already indicated previously, it does not believe that evidence of proceedings before that Commission are relevant here.

Mr. Bury: We believe that, in addition to other matters, this exhibit is helpful in interpreting the 1945 contract, which is Exhibit 5 in this proceeding.

Presiding Examiner: The objection is sustained.

(The document heretofore marked for identification Exhibit No. 24 was rejected.)

Mr. Bury: We would like to make an offer of proof of Exhibit 24.

Presiding Examiner: You may proceed, Mr. Bury.

Mr. Goldberg: Mr. Bury, you are aware you haven't offered 23 yet?

Mr. Bury: Pardon me. This might be an appropriate time to offer in evidence Exhibit 23, which is the exhibit about which Mr. Ashley testified.

Mr. Goldberg: With respect to that, we have no objection to its admission for the limited purpose stated by the Examiner in connection with Exhibits Nos. 19, 20, 21 and 22.

Mr. Bury: I might comment that the witness' testimony indicates the purposes for which it is offered, and which I believe the transcript will show to be somewhat limited.

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Presiding Examiner: Exhibit 23 will be admitted in evidence, without any limitations placed upon it, because all it is is a reference back to an exhibit which the City introduced in attempting to reconcile the figures there.

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(The document heretofore marked Exhibit No. 23 for identification was received in evidence.)

Presiding Examiner: Mr. Bury, did you want to make an offer of proof on Exhibit 24?

Mr. Bury: Yes.

Presiding Examiner: Did you want to make a statement about it, or are you just offering it?

Mr. Bury: I believe, as I say, we earlier have argued the relevancy of material of this nature, and I think those arguments both pro and con apply to the offer of proof.

Presiding Examiner: All right.

You may proceed, then.

By Mr. Bury:

Q. Mr. Ashley, I have handed you a document which bears the notation in the upper right-hand corner, "Application No. 38382, Exhibit No. 53, Witness: C. A. Winder; date, June 13, 1957", and ask you if that is a true and correct copy of an exhibit prepared on behalf of the City of Colton and others and received in evidence in Edison's second rate proceeding before the California Commission in 1957? The document consists of 31 pages, plus an appendix of 11 pages.

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A. Yes.

Mr. Bury: Your Honor, before offering this exhibit in evidence——

Presiding Examiner: Do you want it marked?

Mr. Bury: Yes.

Presiding Examiner: It will be marked Exhibit 25 for identification.

(The document above referred to was marked Exhibit No. 25 for identification.)

Mr. Bury: Before identifying that, I would like—because it is rather bulky—to specify the pages of that

exhibit upon which we would intend to rely. Those are pages 5, 6, 19, 20, and page 22, and also page 30, and in the appendix to that exhibit, commencing in the middle of page 8, the portion starting "No. 4, Colton", and continuing through pages 8, 10, and 11, to the end of the appendix.

We would like to offer Exhibit 25 in evidence at this time.

Mr. Goldberg: Just give us an opportunity to look at those pages, will you, please?

Mr. Bury: Certainly.

(Pause.)

Mr. Goldberg: Mr. Examiner, we would make the same objection to Exhibit 25 for identification. It seems to us to be entirely within the same category of thing as Exhibit No. 24 which was rejected.

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Presiding Examiner: Mr. Everett?

Mr. Everett: Mr. Examiner, the Staff's objection to Exhibit No. 24 is equally applicable to Exhibit No. 25.

Mr. Bury: It is Edison's position that this exhibit, and particularly the portion in the appendix from the middle of page 8 to the end, is very pertinent and useful in interpreting, construing the intention of the parties with respect to the 1945 contract which is Exhibit 5.

Presiding Examiner: The objection is sustained.

(The document heretofore marked Exhibit No. 25 was rejected.)

Mr. Bury: We would like to make an offer of proof of Exhibit 25.

By Mr. Bury:

Q. Mr. Ashley, you testified earlier about electric service within the City of Colton, both by Colton and by Edison.

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Mr. Goldberg: I had the same trouble the witness appears to be having. I couldn't hear all of it.

By Mr. Bury:

Q. You testified earlier with respect to electric service within the City of Colton, both by Colton and by Edison, and you described generally the customers which Edison has.

Are the Derby and Globe Mills distribution circuits which are connected to City of Colton substation, where delivery is

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made to the City of Colton for resale, are those circuits also used by Edison to serve other customers? A. Yes.

Q. What are those customers? A. On the Globe Mill circuit is the industrial account of Pacific Fruit Express as mentioned by Mr. Montgomery this morning, and on the Derby circuit is a railroad section house and several lighted billboard signs.

Q. I see.

Mr. Ashley, referring to Exhibit 5, the contract, and to the center of page 3, the paragraph which recites "This agreement shall continue for a period of ten (10) years from date hereof and shall automatically continue from month to month thereafter until terminated by either party by written notice served on the other party." To your knowledge has that contract been terminated by either party? A. No, it has not.

Q. Mr. Ashley, has Edison filed the written agreement with the City of Colton, which is Exhibit 5, with the Federal Power Commission as a rate schedule? A. No.

Q. Has Edison filed any subsequent rates charged to the City of Colton with the Federal Power Commission? A. No.

Q. Has Edison, however, advised the Federal Power

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Commission from time to time of all rates being charged by it for electric service? A. Copies of effective schedules are distributed to the Federal Power Commission at the same time as they are distributed to our customers and other interested parties.

Q. Those are supplied, you believe, for informational purposes? A. Yes.

Mr. Goldberg: Are you going to develop how?

Mr. Bury: Not particularly, no.

That is all.

Presiding Examiner: Mr. Roos, do you have any questions——

Mr. Bury: Excuse me. The witness said he wanted to ask me something.

Presiding Examiner: Very well.

(Pause.)

Mr. Bury: That is all.

Presiding Examiner: Mr. Roos?

Mr. Roos: We have no questions, Mr. Examiner.

Presiding Examiner: Mr. Goldberg?

Mr. Goldberg: Just a preliminary question or two.

Cross-Examination

By Mr. Goldberg:

Q. This sale off the Globe Mill circuit to Pacific Fruit Express, is that a sale for resale?

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A. No, that is an industrial customer.

Q. I see.

At what voltage is the delivery made? A. I am not aware of the delivery voltage.

Q. How about the delivery to this railroad section house off the Derby circuit, is that a sale for resale? A. No.

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Q. Are the sales for these billboard signs sales for resale? A. No.

Q. Do you know the voltages involved? A. They would be at our single-phase—it would be single-phase service at 120-240 volts.

Q. You might say consumer voltage? A. One of several consumer voltages.

Q. Now this service off the Globe Mill circuit, as I understand it, the Globe Mill circuits and the Derby circuits run from your substation, your Colton substation to the City's substation, is that right? A. Yes, they do.

Q. How is this service to Pacific Fruit Express effected? Is there a tap at some point between your substation and the City substation? A. Yes, there is a tap in that the customer is served from that 12 kv circuit.

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Q. Can you describe the facilities involved? A. No, I am not prepared to do that.

Q. Will you be prepared when you come back for cross-examination, please? A. Yes.

Q. And the same with respect to all service rendered within and without the City of Colton by your company. You described a large number of customers that your company serves, itself, in addition to this Pacific Fruit Express and the railroad section house. I think you mentioned commercial customers, domestic customers? A. Yes. I said there were some 78 such customers in the City of Colton served by Edison.

Q. Yes.

Will you be prepared to answer questions regarding the facilities involved, the voltages, things of that sort?

Mr. Bury: Your Honor, I don't think it is incumbent upon Mr. Goldberg to instruct this witness to what extent he should prepare for cross-examination. I do appre-

ciate you indicating you intend to inquire into that subject.

Mr. Goldberg: Of course only that. It is not a matter of instruction. He has testified on direct and here I have discovered he isn't in a position to answer some questions and I want to be sure that he will have the information available.

That is all we have at this time.

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Presiding Examiner: Mr. Everett?

Mr. Everett: Just one question, Mr. Examiner.

By Mr. Everett:

Q. Mr. Ashley, I believe you stated that certain of the Edison Company's rate information was furnished to the Federal Power Commission. Do you know for what purpose or pursuant to which requirement this information is furnished to the Commission? A. It is my belief that the information is used in two ways: One is to compute the typical bill reports which are published by the Federal Power Commission, and the second is to prepare a summary of the rates of our company as well as the others reporting for the Federal Power Commission's National Rate Book.

Mr. Everett: Thank you.

Mr. Bury: Southern California Edison Company rests.

Presiding Examiner: You are temporarily excused, Mr. Ashley, subject to recall for cross-examination.

(Witness excused.)

Presiding Examiner: Does the Staff have a recommendation about when we will reconvene for cross-examination?

Mr. Everett: Yes, Hour Honor. The Staff suggests the week of January 11th as the time for reconvening for cross-examination of the Company's witnesses.

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Mr. Goldberg: That is a Monday? You are suggesting January 11th, a Monday?

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Mr. Everett: Yes, Mr. Goldberg.

Mr. Goldberg: That is satisfactory to us.

Mr. Bury: I would have two comments. The time, generally, is a satisfactory one. I would like, first, to recommend that we reconvene in Los Angeles for the convenience of the four witnesses who are going to be cross-examined and for many others of us who live out that way. I don't know how these requests are handled, but it just seems sort of appropriate to make it.

The second request that I would make is that if the first request is denied that we convene on a Tuesday so that we will not be required to travel on a weekend.

Presiding Examiner: I don't know that I can rule on where we will reconvene. The Commission will set it down in their Notice in a hearing room of the Federal Power Commission at 441 G Street in Washington.

Mr. Bury: I appreciate that.

Presiding Examiner: Then it is the Staff's suggestion—do you want to change your date from January 11th to January 12th?

Mr. Everett: Certainly, sir. Is that agreeable?

Mr. Goldberg: Yes.

Mr. Cragun: Yes.

Presiding Examiner: —that we reconvene on Tuesday, January 12, for cross-examination of the Southern California Edison witnesses and that such date was agreed to by all parties.

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Mr. Bury: Might I make one request, because counsel for Colton had indicated at least there was some possibility they might not wish to cross-examine Dr. Soren-

sen, it would be appreciated if they come to that conclusion that we could be advised let's say seven days prior to that hearing date should they so conclude.

Mr. Goldberg: I can't understand a commitment for any particular time, nor do I want to be put in the position of having to carry out any commitment in that respect. Let me say this, that we don't want the Company to be put to the burden and expense of unnecessarily bringing back witnesses here and that we are going to do our best—or to inconvenience the witnesses themselves.

Mr. Bury: That was the purpose of making that request.

Mr. Goldberg: Yes.

We will do our level best to advise you in advance if we are not going to cross-examine a witness. We might check with the Staff before doing that as to whether they are going to ask that he come back, and if they are there would be no point in advising you ourselves.

Mr. Bury: All we ask is your consideration in that regard.

Mr. Goldberg: And that we assure you. Sometimes things just don't work out the way you would like to have them work out.

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Presiding Examiner: There being nothing further to come before this Examiner, this Court will be in recess until 10 a.m., January 12, 1960.

(Whereupon, at 4:02 o'clock p.m., the hearing in the above-entitled matter was adjourned, to reconvene at 10:00 o'clock a.m., Tuesday, January 12, 1960.)

• • •

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TUESDAY, MAY 3, 1960

The above-entitled matter came on for further hearing, pursuant to notice, at 2:45 o'clock p.m.

• • •

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ADDITIONAL APPEARANCES:

MARY MORAN PAJALICH,
appearing on behalf of the California Public Utilities Commission.

BORIS H. LAKUSTA, of Graham, James & Rolph, 310 Sansome Street, San Francisco, California, appearing on behalf of Southern California Edison Company.

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PROCEEDINGS

Presiding Examiner: The hearing will come to order.

I am sorry it was necessary to recess this hearing from 10 this morning until this time this afternoon. But as most of you know, I have been hearing the Transwestern case in G-14871, and we were trying to complete the cross-examination of one of the various witnesses so that we might then recess until a later date to complete the cross-examination of the others, and it ran through a little longer today than we had anticipated.

Are there any preliminary matters?

New appearances, I assume, have already been entered.

I understand the California Commission has some evidence which they wish to introduce, and perhaps it would be appropriate to take that up now, before we proceed with the cross-examination of Edison's witnesses, in order that those of you present may look at the record and

determine whether or not you will have cross-examination of the California Commission's witness at another session of this hearing.

Miss Pajalich: Mr. Examiner, I am Mary Moran Pajalich, from the California Commission, here in response to the order fixing date of hearing, sent by this Commission, in the matter of the City of Colton, Petitioner, versus Southern California Edison Company, Respondent. This Commission has the testimony of its engineer, Mr. Leonard Patterson, rather short

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testimony, and some exhibits which have been already mailed to the various parties.

The California Commission proposes to show by its witness that there is no way in which an engineer can, with certainty, conclude that any energy generated outside of the State of California is sold to the City of Colton by Edison.

It further proposes to show the City of Colton, together with other customers is served from Edison's distribution facilities, rather than from transmission facilities.

Evidence will be offered also to show the energy coming into the Edison system from Hayfield represents merely a trivial flow of interstate energy. In 1958 it was only one percent of the total energy transmitted on the Edison system. The sale to Colton represents only a minuscule portion of the total energy transmitted on the Southern California Edison system. Since, as the witness will testify, it represents but 15 one hundredths of one percent of the total energy. This latter evidence will be offered not only for the purpose of showing that the regulation of the Edison Company is essentially a matter of local concern, but it is also offered for this reason: While the California Commission denies that it has been proved

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or can be proved that any sale of energy generated outside the state of California is delivered to the City of Colton by the Edison Company, nevertheless in the unlikely possibility that after considering all of the evidence this Commission should conclude

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that some of the energy which Edison sells to Colton is generated outside of the State, then if this Commission further determines in its administrative discretion not to exercise its jurisdiction over de minimis flows or trivial flows of interstate energy, the California Commission feels that it is material and relevant that the Commission should have before it in the record the trivial quantity of interstate energy that flows into the Edison system, otherwise it can have no base upon which to exercise that discretion which has been vested in it and which it recently asserted in the case of Shamrock Oil and Gas Corporation, 31 PUR 3rd 84, at page 86.

Lastly, the California Commission proposes to show that the—that that Commission has exercised jurisdiction over Edison Company's sales of electric power to Colton for many years. Reading from the transcript a remark by Mr. Goldberg at page 329, he said, "If such an offer were made only for the purpose of showing historical pattern," he would probably have no objection to it. We would offer the history of California regulation of Edison sales to Colton for that purpose.

If I may now, Mr. Examiner, I will call my first witness.

LEONARD S. PATTERSON

was called as a witness and, having been first duly sworn, was examined and testified as follows:

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Direct Examination
By Miss Pajalich:

Q. Mr. Patterson, by whom are you employed? A. By the California Public Utilities Commission.

Q. In what capacity? A. I am a Senior Utilities Engineer in the Electric Section of the Public Utilities Division.

Q. Will you please describe briefly your technical education? A. My engineering education was obtained at the California Institute of Technology where I received the degree of Bachelor of Science in Applied Physics in 1935, and the degree of Master of Science in Electrical Engineering in 1936.

Q. Have you worked for any electric utilities? A. Yes. From 1936 to 1939 I was employed by the California Electric Power Company as an engineer. During that period I obtained comprehensive experience in the utility's operations, as I worked in each of the utility's departments including the Operating, Construction, Engineering, Commercial, Accounting and Executive Departments. This electric utility operates in the Southern part of California, some of its territory, such as San Bernardino, being jointly served with the Southern California Edison Company.

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Q. How long have you been employed by the California Public Utilities Commission? A. Twenty-one years.

Q. Will you describe briefly your assignments and experience with the California Public Utilities Commission? A. I have been assigned to electrical engineering matters in the Utilities Division for the entire 21-year period with the exception of a three and one-half year

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period when I was on leave of absence for duty in the United States Armed Forces. At that time I was a Captain in the Signal Corps performing engineering duties in connection with the operation and maintenance of radar equipment.

I have been located in the Southern California office of the Commission for 15 years and for 11 of those years I have been in charge of, and have supervised, the staff's work which arises in connection with operations of the electric utilities in Southern California, which includes the Southern California Edison Company. Through my participation as a witness or staff representative in many rate, certificate, and other formal proceedings involving the Southern California Edison Company, as well as through innumerable informal matters concerning that utility's service and tariffs, I have gained a rather comprehensive knowledge of the Southern California Edison Company's operations.

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For example, in each of the last two general rate proceedings of the Southern California Edison Company, and which led to the California Commission decisions which are Exhibits Nos. 21 and 22 in this proceeding, I analyzed the Edison Company's production, transmission and distribution operations and presented testimony thereon as an expert witness.

Q. What did you do in preparation for the present proceeding? A. I reviewed the Federal Power Commission Staff Engineering Report which was distributed to the parties to this proceeding. I read the testimony presented at the three days of hearings, December 8th, 9th and 10th. I examined the exhibits which were introduced at those hearings. I made a number of field investigations to review the electric facilities involved in this

matter, with particular emphasis on the transmission and distribution facilities in the Colton-San Bernardino area. I examined Southern California Edison Company maps, records and reports as they relate to service to the City of Colton. I researched the California Public Utilities Commission's files as they pertain to electric service to the City of Colton and finally, after applying engineering judgment and knowledge of electric utility operations, I prepared certain exhibits.

Q. Mr. Patterson, are you familiar with the physical nature of the Southern California Edison Company's electrical

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system and the manner in which it is operated? A. Yes.

Q. Will you briefly describe that operation. A. The Southern California Edison Company operates an integrated electrical system which is tied together by a network of 220,000-volt transmission lines. Nearly all of the energy is fed in to this 220,000-volt transmission system from generating plants at 14 separate locations. This results in a 220,000-volt transmission grid system in which energy will flow to the load centers in accordance with demands imposed upon the system by its customers. Transmission substations are located at 20 load centers on the Edison system where the voltage is stepped down from 220,000 to 66,000 volts. In each of these load centers a network of 66,000 volt lines carries energy to distribution substations where the voltage is stepped down to distribution voltages and then fed out over a network of distribution lines to the utility's customers.

Q. I show a map entitled "Southern California Edison Company 220 KV Transmission System and Major Production Facilities Serving San Bernardino Area." Was that prepared by you or under your direction? A. Yes.

(379)

Miss Pajalich: May that be marked for identification.

Presiding Examiner: Exhibit 26 for identification.

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(The document referred to was marked Exhibit No. 26 for identification.)

Miss Pajalich: These maps were mailed to the parties last March. We have extra copies if anybody else desires them.

By Miss Pajalich:

Q. Will you explain Exhibit 26 for identification, please, what it shows? A. Yes. Exhibit No. 26 for identification is a map which shows the Edison 220 KV transmission system and major production facilities which serve the San Bernardino area. With the exception of the energy produced locally in the relatively small hydro plants located in nearby San Bernardino mountains, under normal operating conditions, all of the energy sold by the Edison Company in the San Bernardino area which includes the sale to the City of Colton must come from the 66 KV bus at the Highgrove transmission substation which is shown near the margin on the right-hand side of the exhibit.

As shown on the map, there are three 220 KV transmission lines which tie the Highgrove substation into the integrated 220 KV transmission system. One of the lines goes east to Hayfield, a distance of 105 miles, where the interconnection is made with facilities of the Metropolitan Water District of Southern California, often referred to as MWD.

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A second goes west and north from Highgrove, a distance of 15 miles, to the Etiwanda steam plant and substation. The third line goes west and south from Highgrove to Chino substation, a distance of 22 miles.

Q. I think you misspoke yourself relative to the direction, did you not? You said west and south from Highgrove? A. If I do, I am sorry. It goes west—which one did you think I misspoke on?

Q. Perhaps I am mistaken. A. I will go back.

The second line I referred to goes west and north from Highgrove to Etiwanda. The third line goes west and south from Highgrove to Chino Substation, which is a distance of about 22 miles.

The arrows at the Chino substation designate additional 220 KV transmission lines and the general direction in which they lead out of the substation to connect with the 220 KV grid. It will be noted that two lines go northeast a distance of 234 miles to Hoover Dam, one line goes west a distance of 20 miles to Walnut transmission substation, and another line goes south 26 miles to Barre transmission substation. Likewise, at the Etiwanda substation, the arrow designates a 220 KV line which goes south a distance of 38 miles to Barre transmission substation.

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Q. Mr. Patterson, the energy on the 66 KV bus at Highgrove comes from what source?

Mr. Goldberg: Mr. Examiner, I have not heard any foundation for the question, that the witness made any studies tracing the flows.

Miss Pajalich: I don't know how long Mr. Goldberg has been in the room. But the witness testified he was familiar with the physical nature of the Southern California Edison system and the manner in which it was operated.

Mr. Goldberg: One could be familiar with the manner in which——

Presiding Examiner: Do you have an objection?

Mr. Goldberg: Yes, on the ground no foundation has been laid for it.

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Presiding Examiner: The objection is overruled.

Miss Pajalich: Do you have the question in mind?

The Witness: Yes. It is impossible to identify a specific source, although theoretically such a determination could be made under certain circumstances.

By Miss Pajalich:

Q. Would you explain your answer? A. The energy on this bus is supplied through the two 220 to 66 KV transformer banks at that substation. The 220 KV windings of these transformers are connected to the substation 220 KV bus which is an integral part of the 220 KV

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transmission grid system, which receives energy from 15 different sources.

Q. You stated that theoretically it might be possible to identify the source of energy under certain circumstances. Would your explain what you meant? A. Yes. To take an example, assume you have a load of 80 megawatts on the Highgrove 220 to 66 KV transformer banks and a flow of 90 megawatts out of Highgrove on the Chino line. This makes a total flow-out of the Highgrove sub of 170 megawatts. Now if we assume in our example that there is a flow into Highgrove from the Hayfield connection of 30 megawatts there would have to be a flow in from the Etiwanda connection of 140 megawatts so that the system would be balanced. Since the load of 80 megawatts on the transformer banks exceeds the Hayfield source in my example of 30 megawatts it follows that at least the difference of 50 megawatts, if not the entire 80 megawatts, would come from the Etiwanda connection.

Mr. Goldberg: Mr. Examiner, may I have that read back? I missed some of the values and the directions.

Presiding Examiner: Yes.

(Answer read.)

(385)

By Miss Pajalich:

Q. Suppose in the example you used you had values only for the Hayfield line and the 220 to 66 KV transformer

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banks but did not know the values for the lines from Etiwanda or Chino. How would that affect your conclusion? A. In that case, if the load on the 220 to 66 KV transformer banks exceeded the supply from the Hayfield line, it could be concluded that at least some of the energy on the 66 KV bus comes from either the Etiwanda or Chino line or from both. If the supply from the Hayfield line exceeded the load on the transformer banks, then no conclusion could be made that any specific source of energy is delivered from the 66 KV bus.

Q. Have you examined the metering at the Highgrove substation? A. Yes.

Q. What metering exists at the Highgrove substation? A. Of course, they have a great amount of metering there but the metering at the Highgrove substation which is pertinent to this situation is a watt meter on the Hayfield 220 KV line which measures the rate of flow of energy in or out on that line. There are watt meters on each of the 220 to 66 KV transformer banks which measure the rate of flow of energy out of the substation on the 66 KV system.

Q. Are there any watt meters installed on the 220 KV lines which connect Highgrove to Etiwanda and Chino substation? A. No.

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Q. Since, as you have indicated, watt meters are not installed on two of the lines, is there any way in which an engineer can conclude with certainty that any energy from outside of California is delivered to the City of Colton?

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Mr. Goldberg: Mr. Examiner, I object to the form of the question. If it were directed solely to this witness' judgment, I would have no objection to the question. But this question says, "Can any engineer." I don't think he can undertake to speak for all the engineers we have in the country.

Miss Pajalich: I asked the witness for his opinion. He is qualified as an expert.

Presiding Examiner: Objection overruled.

The Witness: No. Since watt meters were not installed in the Etiwanda and Chino lines at the time of the FPC staff investigation, nor at any other time to my knowledge, it is not possible to conclude that any out of state energy has been delivered to the City of Colton.

Miss Pajalich: I offer Exhibit 26 for identification in evidence.

Presiding Examiner: I will reserve judgment until after cross-examination.

Mr. Goldberg: Mr. Examiner, a question for clarification. But I ask that the last question and answer be read.

Presiding Examiner: Mr. Goldberg, I don't know if you

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were here. But I stated we would put the direct testimony of their witness in the record, and then he would be available for cross-examination following the cross-examination of the four Southern California witnesses.

Mr. Goldberg: This, however, Mr. Examiner, is a question of clarification to understand the last answer he has made.

Presiding Examiner: That is a proper part of cross-examination.

Mr. Goldberg: I will simply have to wait until I see the record, I suppose. But I doubt that it is going to mean any more to me.

Presiding Examiner: I understand that it is the custom here to put in the direct and then recess until some time in the future for the cross-examination. But inasmuch as this witness' direct testimony will be available to you tomorrow morning, and he will be available the rest of the week or until we get through with this case, which must be by Monday night of next week, you can ask all the questions then you want on cross-examination which are anything different from clarifying questions.

Mr. Goldberg: Yes, I wasn't seeking preliminary cross. I was seeking understanding of his last answer. There seemed to be missing a direction of flow in the last answer, and I am not sure what the answer means.

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Presiding Examiner: We will get to that when he appears for cross.

By Miss Pajalich:

Q. Mr. Patterson, returning now to the 66 KV bus at the Highgrove substation, how is the energy delivered from that point to customers in the Colton area? A. From the 66 KV bus at Highgrove substation, a network of 66 KV subtransmission lines fan out to supply distribution substations where the voltage is stepped down to distribution voltages for supplying consumers over local distribution lines.

Q. Have you prepared a diagram to show the 66 KV system associated with serving the Colton area? A. Yes, I have.

Q. I show a diagram entitled "Schematic Diagram of Southern California Edison Company 66 KV Transmission System and Substations Pertinent to Serving Colton Area." Was this diagram prepared by you? A. That is correct.

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Miss Pajalich: May it be marked for identification, Mr. Examiner?

Presiding Examiner: It will be marked for identification Exhibit 27.

(The document referred to was marked Exhibit No. 27 for identification.)

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By Miss Pajalich: Now, Mr. Patterson, would you please explain briefly what is shown on Exhibit 27 for identification? A. Yes. This is a schematic diagram which shows the Southern California Edison Company 66 KV transmission system and substations pertinent to serving the Colton area. The diagram has been simplified to the extent that switches that are closed under normal operating conditions are not shown. The Highgrove 66 KV bus is indicated at the lower center portion of the diagram. From that bus two 66 KV lines go directly to the Edison Colton distribution substation shown in the upper left portion of the diagram.

Two 66 KV lines also go from Highgrove to the Cardiff distribution substation in the upper right portion of the diagram.

From Cardiff a single 66 KV line goes to the Edison Colton substation. A fifth 66 KV line out of Highgrove goes to the Colton substation by way of the Colton Cement Company. Under emergency supply conditions this same line may be energized from the Chino substation by closing the air break switch shown on the left center of the diagram.

There is also shown another 66 KV line from Chino which may be used to interconnect the Chino, Highgrove, Colton substations. Still another interconnection may be made by a 66 KV line to Declez sub as shown by the arrow from the

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Colton sub in the upper left corner of the diagram.

Q. Are there any other means of interconnecting the 66 KV facilities shown on Exhibit No. 27 for identification with other parts of Edison systems? A. Yes, at both Highgrove and Cardiff substations there are 66 to 33 KV transformer banks through which connections are made to a 33 KV grid which serves parts of the Redlands and San Bernardino districts. This 33 KV grid receives a portion of its energy from small hydro plants located in the nearby mountains. Some of these hydro plants also feed energy directly into the local 12 KV distribution lines.

Q. Have you shown any 12 KV facilities on Exhibit No. 27 for identification? A. At the Edison Colton substation I have shown the 12 KV bus which is fed through transformer banks from the 66 KV bus.

Q. How is energy distributed to customers from this 12 KV bus? A. The manner in which energy is distributed from the Colton substation may be best explained by reference to an Edison Company switching center diagram for the Colton area.

Q. I show you a large diagram entitled "Colton Switching Center 12 KV Lines," and ask you if that is the diagram

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to which you have reference? A. It is.

Q. What is the source of this diagram, Mr. Patterson? A. It was supplied to me at my request by the Southern California Edison Company. It is one of their standard operating diagrams.

Q. Is it correct to the best of your knowledge? A. It is.

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Miss Pajalich. May it be marked as Exhibit next in order for identification?

Presiding Examiner: It will be marked Exhibit 28 for identification.

(The document referred to was marked Exhibit No. 28 for identification.)

By Miss Pajalich:

Q. Mr. Patterson, was this Colton Switching Center diagram currently in use when the FPC staff was conducting its investigation and when you started your review in the latter part of 1959? A. Yes, as indicated in the box in the lower left corner of the exhibit, this is revision No. 4 of the Colton Switching Center 12 KV lines and is dated March 18, 1959.

Q. Will you point out on Exhibit No. 28 for identification the distribution lines which serve the Colton area? A. The Southern California Edison Company Colton

distribution substation is designated by the heavy circle with the "A" in it labeled "Colton" near the lower left center of the diagram.

The eight lines which radiate from that circle are the 12 KV distribution lines which carry energy to distribution transformers and customers throughout the Colton area. These lines are named Domic, Globe Mills, Bemis, Derby, Loma Linda, Cooley, Mansa and Cactus.

Q. Which of these circuits serve the City of Colton substation? A. The Globe Mills and the Derby circuits are looped through the City of Colton substation which is shown about 1¼ inches above and to the left of the Edison Colton distribution substation.

Q. Do those two circuits, as shown on the exhibit, supply any customers besides the City of Colton? A.

Yes. The Globe Mills circuit also supplies Pacific Fruit Express as shown by the circle labeled "P.F.E." just above the lettering "Globe Mills." The Derby circuit also supplies six other customers at a location near the switch in the line numbered 377.

Q. Could the City of Colton's substation be served from any other 12 KV circuits? A. Yes, for example, by closing the air break switch No. 246 on the extension of Globe Mills circuit to the left and above the sub of the City of Colton, connection could

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be made to the Cardiff substation. Also, the Derby circuit could be connected to Cardiff sub by closing switch No. 371 just above and to the right of the Edison Colton substation. The large number of switches as shown on the 12 KV lines is typical of the design of a distribution system to permit flexibility in operation.

Q. Would you consider the facilities shown on Exhibit No. 28 for identification to be transmission or distribution facilities? A. Distribution Facilities.

Q. Would you tell us what you mean by distribution facilities? A. By distribution facilities I mean those facilities through which energy is carried or distributed to customers as distinguished from the transmission facilities which are primarily used for carrying energy from generating sources to load centers.

Miss Pajalich: I would at this time offer Exhibits 27 and 28 for identification, unless counsel prefers that the receipt be deferred until after cross-examination.

Presiding Examiner: That is usually my custom, to admit or reject them after cross-examination.

Miss Pajalich: Very well, Mr. Examiner.

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By Miss Pajalich:

Q. Have you given any study to energy sources

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separated between energy generated in California and that generated outside of the State of California, as related to the quantity of energy delivered to the City of Colton? A. Yes, I have.

Q. Do you have before you a chart entitled "Southern California Edison Company Energy Source Chart as Related to Serving City of Colton, Year 1958"? A. Yes.

Q. Was that prepared by you, Mr. Patterson, or under your direction? A. It was.

Miss Pajalich: May it be assigned an exhibit number for identification, Mr. Examiner.

Presiding Examiner: It will be marked Exhibit No. 29 for identification.

(The document referred to was marked Exhibit No. 29 for identification.)

By Miss Pajalich:

Q. Would you explain what is shown on Exhibit 29 for identification?

Mr. Goldberg: I object to the question, Mr. Examiner, this exhibit, which has been marked No. 29 for identification, and which the witness has been asked to explain, is in the same category and suffers from the same difficulty that rejected Exhibit 16 suffers from. The difference between

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the two, as I see it, one is a graphic portrayal of the total generation on the system, whereas Exhibit No. 16, which was offered by Southern California Edison Company, is a tabular representation, and covers the years '54, '55, '56 and '57, as well as 1958.

I have not attempted a comparison of the figures for 1958. I don't think my objection is affected by that. That would only be a matter of reconciliation, mathematical reconciliation. And I would emphasize, Mr. Examiner, the reason, one of the reasons that I advanced for objecting to Exhibit No. 16, namely, that we are not concerned with the percentage of interstate energy in relation to the total generation on the system. If this portrayal were relevant at all, it could only be relevant if it were limited to the sources of generation which could reach Colton, and the relationship of the out of state energy to that source.

I might point out in this connection, Mr. Examiner, that contrary to the statement of counsel for the California Commission, the matter of de minimis has no bearing with respect to Commission's jurisdiction, and the Commission has no discretion, notwithstanding the fact that one might characterize a flow as de minimis, and notwithstanding the fact that the Commission itself might think it de minimis, to take or reject jurisdiction. There are no exemptions in the power act which vest any discretion in the Commission.

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And in that regard it is unlike the statute which the Securities and Exchange Commission administers, where there are standards for the exercise of discretion. For those reasons we object to this question.

Miss Pajalich: May I be heard, Mr. Examiner?

As I remarked in my opening statement, the California Commission does not concede that the testimony thus far adduced by the FPC staff or through Mr. Goldberg's questioning has proved in any sound engineering manner that any interstate energy is sold to the City of Colton by Edison.

However, as I did state in my opening statement, this exhibit and the testimony of Mr. Patterson is offered to

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show the trivial nature of the interstate energy which enters the whole system, and the small amount of the total energy which is sold to the City of Colton.

Mr. Goldberg has stated that the Federal Power Commission has no jurisdiction to exercise its discretion or to entertain evidence as to the de minimis nature of trivial flows of interstate commerce.

May I call the Examiner's attention to the decision of this Commission in the Shamrock Oil and Gas Corporation Case which was decided last November 20, 1959, and is reported in 31 PUR 3d, page 84, and I would like to read from page 86, wherein this Commission, citing the Connecticut Light and Power versus Federal Power Commission case,

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said: "We may compare the language in Connecticut Light and Power Company versus Federal Power Commission," giving the citation where the court indicated the Commission did not have to assume jurisdiction over trivial flows of interstate power. "Congress appears to have left to the Commission's sound administrative discretion whether or not to assert its authority in such situations."

Then this Commission goes on to cite a line of Interstate Commerce Commission cases. The Commission goes on—preceding the citation of the Connecticut Light and Power Company case, the Commission says, "We believe we have discretion as to whether to pursue inquiries which are likely to be bootless while neglecting matters of great importance."

Then it cites the Connecticut Light and Power Company case. "The rejection by this Examiner of the exhibit offered by Edison was prior to the decision in the Shamrock case, so actually this Commission has now

asserted its jurisdiction to exercise its discretion in these particular instances."

Mr. Goldberg: Mr. Examiner, I think counsel for the California Commission has missed the point entirely. Whether the Commission should or should not undertake an investigation at all to determine whether its jurisdiction exists where it has a heavy workload and it has to decide as a matter of housekeeping whether it is going to take up one matter or another, certainly the Commission can decide that it will

take the more important of the matters up for investigation. But where the Commission embarks upon an investigation to determine whether its jurisdiction exists it cannot hold that its jurisdiction does not exist because the amount of out of state energy may be de minimis.

It is obvious from the Shamrock case where the Commission does not refer to Jersey Central Power and Light, decided by the Supreme Court, that the Commission did not intend there to overrule the Jersey Central Power and Light case. In that case you will recall it was contended that the flows of out of state energy were intermittent and de minimis, and the Supreme Court clearly holds that that is beside the point.

Now, that is the point we are concerned with here. Beyond that, Mr. Examiner, I would again emphasize that if an exhibit of this character were at all germane to the issues it would have to be an exhibit limited to the sources of generation that could be used to supply Colton, and there would have to be evidence that all of the sources of generation on this system of Southern California Edison could be used to supply the City of Colton. And there is no such evidence here.

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But we don't have that kind of exhibit. I submit it has the same fatal defects that Exhibit No. 16 has.

Miss Pajalich: Mr. Examiner, Mr. Goldberg again asserts

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this Commission has instituted an investigation in this proceeding. As I read the title of the proceeding, it is a petition by the City of Colton against the Edison Company, and I cannot see that a mere order fixing a date of hearing constitutes an order of investigation of this Commission. That is Part No. 1.

Secondly, in the Shamrock Oil case, Mr. Goldberg said that the Commission does not have jurisdiction to deny its discretion after having instituted an investigation. Well, that is not germane to this, because this Commission hasn't instituted an investigation. Even if it had done so, which I deny that it has done, in the Shamrock Oil case the Commission suspended the rate schedules filed by the company in that case, and subsequently allowed rates to go into effect. And then decided after having some hearings, apparently, that the matter was de minimis, that they had better and more important things to do than to entertain the case of the—the rates of the Shamrock Oil Company.

Now, this Commission still has better and more important things to do.

I believe that the trivial flow of interstate energy that comes into this system, and the trivial amount of total energy sold to the City of Colton should be before this Commission, in order that it may decide whether or not to exercise its discretion, as it did in the Shamrock case.

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Presiding Examiner: Mr. Everett, do you have anything to say?

Mr. Everett: Well, the staff believes, Mr. Examiner, with regard to this Exhibit No. 29 for identification that the same issue has arisen that arose when Exhibit 16 for identification was offered, and the staff believes that with respect to Exhibit 29 for identification its purpose, as stated by counsel for the California Commission, shows that the exhibit is not relevant to the question of whether the wholesale sale by Edison to the City of Colton is subject to the jurisdiction of the Federal Power Commission. Therefore, the staff objects to any testimony with regard to this Exhibit No. 29, just as it objected to any testimony with regard to Exhibit No. 16 for identification, which was rejected.

Mr. Goldberg: Mr. Examiner, I think we can close this discussion very quickly.

The Commission in the Shamrock case did not hold that it was without jurisdiction over the rates of Shamrock Oil and Gas Corporation. The fact is clear that it asserted jurisdiction and that its findings were in relation to the existence of jurisdiction over the rates. What it did there was to hold that in view of the size of the sum involved as a result of the rate suspension, that the proposed settlement was in the public interest and that it did not

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have to make findings with respect to the just and reasonable standards in the circumstances of that case that it might have to do under some other circumstances. We don't have that situation here at all. The Shamrock case can't possibly stand for disavowal of jurisdiction, and there was no disavowal of jurisdiction. And the Commission here whether proceeding by way of complaint or investigation is not material to my argument. What I am saying is that the Commission is holding a hearing and if

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the evidence in this case shows the existence of out of state energy and sale or resale in interstate commerce within the meaning of the act the magnitude of the amount of energy involved is of no moment.

Presiding Examiner: The objection before this Examiner is, as I recall, to a question that asked this witness to explain Exhibit 129—Exhibit 29 for identification. The objection is overruled.

I will say in overruling the objection that I have not read the Connecticut Light and Power Company case, in 324 US 515, but I will do so this evening. After I read it, I will permit this witness to answer the other question with regard to this exhibit, and after I read the Connecticut Power and Light case, I might be persuaded to change my ruling on the objection. Until then, I will let it in.

What I am saying is that I may entertain a motion to strike this exhibit and testimony, or this part of it.

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The Witness: This chart, Exhibit 29 for identification, is drawn to scale so that the width of the shaded areas depicts the quantities of energy as measured by kilowatt hours in their proper relationship. At the top of the chart the item labeled "California Generation, 14,705,420,573 kilowatt hours," represents all the energy handled on the Southern California Edison Company's system which is generated in California.

The width of the chart at that point is scaled to represent this quantity of energy, which is about 93 percent of the total energy transmitted on the Edison system.

On the left side of the chart the item labeled "Hoover-Chino, 941,990,700 kilowatt hours," represents energy generated at Hoover Dam outside of California, and which is delivered to the Southern California Edison

Company at Hoover Dam for transmission over the company's two transmission circuits for delivery into its integrated system at Chino. This is about six percent of the total energy handled.

The next source of energy shown on the left side of the chart is labeled "MWD-Hayfield, Highgrove, 177,724,-800 kilowatt hours."

This item represents the delivery of energy from the MWD system at Hayfield, and which is metered at the Southern California Edison Company's Highgrove substation, and comprises about one percent of the total supply.

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Energy from this source comes from the Hoover-Davis-Parker system. The generation at Hoover Dam and Davis Dam is located outside of California, whereas generation at Parker Dam is in California.

The total of these three sources, California generation, Hoover-Chino, MWD-Hayfield, Highgrove, constitute (sic) the total energy transmitted on Edison Company System of 15,825,136,073 kilowatt hours as shown by the designation near the center of the diagram.

From the 220,000-volt transmission system energy is disseminated to load centers through 20 transmission substations. The flow of energy on the utility's 220,000-volt transmission system at Highgrove to supply the San Bernardino area is depicted at the right side of the chart by the item labeled "Highgrove Sub 220/66 KV, 653,987,400 kilowatt hours," which is about four percent of the total energy.

The amount of energy which flows from the Highgrove substation to the Edison Company Colton Substation, and which is distributed therefrom, is shown by the item that branches off from the Highgrove Sub branch, and which

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is labeled, "Edison Colton Sub 66/12 KV, 81,912,800 kilowatt hours."

This amounts to about one-half percent of the total energy.

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Finally, from this point, there is shown branching off the delivery to the City of Colton substation, which amounts to 23,120,000 kilowatt hours, or 0.15 percent of the total energy transmitted on the Southern California Edison Company's system.

The item at the bottom of the chart shows the remainder of the energy which is transmitted and distributed on the Southern California Edison system, and which amounts to 15,171,148,673 kilowatt hours.

That completes my description of the Exhibit No. 29 for identification.

By Miss Pajalich:

Q. Are all of the points shown on Exhibits 26, 27, 28 and 29 for identification located in California, Mr. Patterson? A. Miss Pajalich, they are, yes, with the exception that Hoover, or Hoover Dam, which is referred to on Exhibits No. 26 and No. 29 for identification, is located outside of California.

Q. Does the Southern California Edison Company serve any customers outside of the State of California, Mr. Patterson? A. No.

Q. Did you make a study, Mr. Patterson, to ascertain whether or not the California Public Utilities Commission

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has exercised jurisdiction over Southern California Edison Company's sales of electric energy to the City of Colton? A. Yes.

Q. What did your study show?

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Mr. Goldberg: May I have the preceding question read, please?

(Question read.)

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Mr. Goldberg: What is the pending question?

(The previous question was read by the Reporter.)

Mr. Goldberg: We object to that. I think we argued at the earlier sessions propriety of questions put by counsel for Southern California Edison. I won't undertake to extend the record further.

You will recall, I might simply say, in that connection, all the cases I referred to where there had been a long continued exercise of jurisdiction by state commissions prior to the time that the Federal Power Commission asserted its jurisdiction, and that fact, it was held by the courts, was immaterial to the existence of the Federal Power Commission.

I refer to the two Wisconsin cases decided by the local court here, and by the Seventh Circuit Court of Appeals.

Miss Pajalich: Mr. Examiner, this testimony and the exhibit which would be offered subsequently are not offered for the purpose of attempting to oust this Commission of jurisdiction, if it has jurisdiction, by reason of the exercise of jurisdiction by the California Commission.

It is merely a historical recitation of facts which have transpired, to which Mr. Goldberg, if memory serves me correctly, said he would have no objection if it was offered for that purpose, when it was offered by the Edison Company previously.

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Mr. Goldberg: I assume counsel is talking about a yet-unmarked exhibit.

Miss Pajalich: I am, sir.

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Mr. Goldberg: Perhaps we can save time by having counsel temporarily withdraw that question, and mark the exhibit, and then we can have it all out at once.

By Miss Pajalich:

Q. You have before you a document entitled, "Tabulation and Brief Summary of References to California Public Utilities Commission Regulation of Southern California Edison Company's Sales of Electricity to City of Colton."

Was that summary prepared by you? A. It was.

Miss Pajalich: May it be given an exhibit number for identification, Mr. Examiner?

Presiding Examiner: It will be marked Exhibit No. 30 for identification.

(Whereupon the document referred to was marked Exhibit No. 30 for identification.)

Miss Pajalich: Mr. Examiner, there is a question pending before the Witness, which is, "What did your study show?"

Mr. Goldberg: In effect the question is: Please describe the exhibit. Let me accept it as such. The last item on the page 3, the only item on page 3 of the exhibit, is a reference to what is Exhibit 27 in this proceeding. The last item on

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page 2 of Exhibit 30 is a reference to what is Exhibit 21 in this proceeding.

And the third item up from the bottom on sheet 2, which on the lefthand side is described as Application No. 27108, is a reference to what is Exhibit No. 5 in this proceeding, No. 5 being the contract between the City of Colton and Southern California Edison Company.

I have not been able to identify the balance of the items and the descriptions don't tell me very much and I am

assuming that this is an accurate summarization by the witness.

It seems to me that Exhibit 30 is subject to the same objections that were made with respect to Exhibits 21 and 27, plus the objection that it is cumulative, and at transcript 340, the Examiner ruled that Exhibits 19, 20, 21, and 22, would be received only to the extent of determining if there were excess charges, and what those excess charges were.

Presiding Examiner: Mr. Goldberg, I don't have the transcript reference in front of me, or in my mind now. But it seems to me that in answer to a—and I am going back a long ways, and I had time only hurriedly to look through this transcript. But it seems to me that in answer to a question propounded to Mr. Montgomery, or to one of the Edison witnesses, and I thought it was Mr. Montgomery, with regard to regulation by the California Commission of the Edison

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Company, you said there you would have no objection to a historical presentation of the items which had appeared before the California Commission.

Miss Pajalich: That is at page 329 of the reporter's transcript, Mr. Examiner. It starts at line 8, that particular statement Mr. Goldberg made.

Mr. Goldberg: Here is what I said: "Mr. Examiner, I would object if this testimony is intended to support the contention of the company that the purported exercise of jurisdiction with respect to the sale by Edison to Colton has any bearing on the issues to be decided in this case. If we are only engaged here in getting some historical pattern of facts and we are getting that only for that purpose, I don't know that I would object to it."

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I by no means made any commitment that I would not object to it. Incidentally, I made a mistake in referring to the item on page 3 as Exhibit No. 27. I should have referred to it as Exhibit No. 25. And that was rejected at transcript page 362.

So we have a combination here of reference to a rejected exhibit, one reference to a received exhibit, No. 5, and another reference to an exhibit received for the limited purpose of determining excess charges.

As I say, I have not been able to——

Presiding Examiner: What is the pending question?

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Mr. Goldberg: I might point out that the items on the first page range from 1918 to 1923, and the top one on page 2 is 1924, all of which I understand antedate the existence of Hoover, which is playing quite a large part in this case.

So any way you turn, any way you look at it, we have here quite a conglomeration, and we don't think it is incumbent upon us to separate the good from the bad. The rule usually is the entire exhibit must be rejected, and counsel then has the burden of coming forward with an exhibit containing only valid items.

For all of those reasons, I would object, Mr. Examiner. It is cumulative, some of the items are irrelevant to any issue and some have been rejected.

Miss Pajalich: It is true some of these decisions antedated even the Federal Power Act under which this Commission is now acting.

Presiding Examiner: The question is, though, whether or not some of Edison's energy comes across the state line.

Miss Pajalich: Yes, sir. But this exhibit is offered only for a limited purpose, and that is the historical facts it contains.

Presiding Examiner: To show that the California Commission have had and continue to maintain jurisdiction over Edison Company, isn't that what it purports to show?

Miss Pajalich: It shows the California Commission has

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exercised jurisdiction over the sales to Colton and over the Edison Company, of course, at all the times set forth in the summary.

Now, it is true some of the exhibits which have been already either received or rejected are mentioned here by decision number. However, that is only a partial list of the exercise of the California Commission's jurisdiction. This is a complete list insofar as this witness has been able to ascertain. For that reason, only, it is offered.

Mr. Bury: Mr. Examiner, I believe this evidence as well as the exhibit we offered are pertinent for another purpose than that mentioned here, and I agree that counsel across the room do not agree with our theory of the case, but we believe that the provisions of the Boulder Canyon Project Act involves (sic) jurisdiction over this particular sale.

By reference to the terms of the Boulder Canyon Project Act, you will see it is pertinent in applying that statute to know whether or not there has been state regulation. Under the way we interpret that statute, that evidence is pertinent to applying that statute, and we believe it should be in this record.

Presiding Examiner: There probably wouldn't have been any hearing if Mr. Goldberg had agreed with you in the theory of the case.

Mr. Bury: Quite right.

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Presiding Examiner: How many more questions do you have to ask of this witness?

Miss Pajalich: About five.

Mr. Goldberg: All on this exhibit?

Miss Pajalich: All on this exhibit.

Presiding Examiner: All on Exhibits 29 and 30?

Miss Pajalich: All on Exhibit 30 for identification.

Presiding Examiner: Well, in order to save time, I will permit you to ask the questions, and then I will look at some of the law that has been cited, and then we will talk about the admissibility of the exhibits that have been marked for identification and a motion to strike some of the testimony.

So let's get it in the record this afternoon, and then when we get to the cross-examination of this witness, we will take that up then.

Mr. Everett: May the Staff comment on this exhibit No. 30 for identification?

Presiding Examiner: Well, I am going to let the California Commission ask their questions. They have four or five more questions to ask. Then I am going to recess. Then I am going to take a look at this Connecticut Light and Power Company case that was decided by the Supreme Court.

After that, then, I will hear you and other parties on the admissibility of this evidence and exhibits. Now, we may strike out part of it, we may leave it all in. At this moment

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I am undecided. I want to look at the law a little bit, and then I will be in a better position to determine whether or not it is admissible.

With that understanding, you may go ahead with the questions.

Miss Pajalich: Thank you. The question before the Witness is what his study of the exercise of the California Public Utilities Commission jurisdiction over the years had shown. That is, of course, evidenced by Exhibit No. 30.

By Miss Pajalich:

Q. But, Mr. Patterson, perhaps you can answer the question by way of explanation of that exhibit. A. Yes. This exhibit lists chronologically the matters in which the California Commission exercises jurisdiction over the sales of Edison Company to the City of Colton, and starting at the first, it would appear that the California Commission first exercised jurisdiction over the sales in 1918, as evidenced by the first item on the tabulation, which refers to application No. 3955 and the Commission's decision No. 6,000 which is dated December 21, 1918.

Presiding Examiner: In what year was energy first produced at Hoover Dam and sold to Edison, and to the metropolitan water district?

Mr. Bury: Mr. Examiner, excuse me, but would you have the witness indicate over which transmission lines, in his answer?

Presiding Examiner: The problem I have with that, Mr. Bury, is this: While the Staff says that the energy involved in this particular sale comes to the City of Colton through the Hayfield connection, nevertheless, I gather from some of the other witnesses, if you have any energy in your line from across the state line, that you can't tell who it is delivered to, it might be delivered to any of your

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customers along the line, depending on whether your switches are open or closed.

Mr. Bury: I believe the Staff has only presented evidence relating to their conclusion that energy is delivered to the City of Colton via the Hayfield connection.

Presiding Examiner: What I was reading from was Mr. Everett's comment to the Examiner on page—at the bottom of page 256 of the transcript, starting with line 21.

Can you tell me, Mr. Patterson, when the energy was first being sold from Hoover Dam?

The Witness: I cannot find the reference to it in my work papers at the moment. I know I have it here, if I have time to look.

Presiding Examiner: Tell me, and tell me when energy was first transmitted over this metropolitan water district line which the Edison tie line ties onto and transports energy to Hayfield.

The Witness: I will be glad to look that up, sir.

Presiding Examiner: Do you have some further questions?

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Miss Pajalich: Yes, Mr. Examiner.

By Miss Pajalich:

Q. I believe you started to talk about the proceedings before the Commission, the first item on Exhibit 30 for identification. The description which follows is the application and decision number in the column headed "Description" summarizes that decision, is that correct? A. That is correct.

Q. With reference to affecting rates or service to the City of Colton, is each succeeding matter in which Edison Company's service to Colton was involved by way of formal proceedings listed successively after the first item in the columns in Exhibit 30 for identification? A. Yes.

Miss Pajalich: That concludes my questions of Mr. Patterson, Mr. Examiner.

I have, if any of the parties here are interested, certified copies of the resolution of the California Commission which is mentioned in the middle of page 2.

Also I have photostatic copies of Southern California Edison's advice letters to the Commission which are likewise mentioned on page 2 of Exhibit 30 for identification.

The decisions which are listed here are, of course, published decisions and are matters of which this Commission may take official notice, if it chooses. And, as Mr. Goldberg

has pointed out, some of them are physically in the record. If anybody wants copies of the advice letters or resolutions, I will be glad to supply them.

Presiding Examiner: Well, it would appear that you would need a definitive ruling on the admissibility of this part of Mr. Patterson's testimony and the exhibits so as to enable counsel to prepare for cross-examination.

About how much cross-examination are you going to have, Mr. Goldberg, of the four California Edison witnesses, and how many days?

Mr. Goldberg: I do not expect it to be extensive, Mr. Examiner. Much will depend, of course——

Presiding Examiner: Will it last tomorrow, the next day?

Mr. Goldberg: Much depends on the ground covered by the Staff. One problem we have is to avoid duplication.

Presiding Examiner: Mr. Everett, what is your best judgment?

Mr. Everett: I cannot at this time venture even a guess, Mr. Examiner. We have some questions that we

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would like to ask of all four of the company's witnesses. I don't know just how long it will take.

Presiding Examiner: What I am getting to is this: I will not—many of you will get a copy of the record sometime tonight. I will not get mine until tomorrow morning. I will

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try to have a ruling for you——

Mr. Goldberg: I probably will not have a copy of the record before the morning, Mr. Examiner.

Presiding Examiner: I will have a ruling for you either at 10 o'clock on Thursday, or, if not at that time, I will tell you then, and have it ready for you by the afternoon session at 2 o'clock on Thursday. So then you will have from then on to prepare for cross-examination of Mr. Patterson, and in the meantime we will go ahead with the cross-examination of the Edison witnesses.

The Witness: I have those dates for you, Mr. Examiner.

Presiding Examiner: Very well. Will you put them in the record?

The Witness: The date that Hoover energy first came into the Edison system, which would have been over the first 220 KV line constructed from Hoover Dam to Chino, are as follows:

The line was tested on May 12, 1939, for the first time, and put in operation June 22, 1939.

So-called third line, which is the connection to the MWD system at Hayfield, was first energized December 31, 1945, at 8:56 a.m., and went into service on that same date at midnight.

Mr. Goldberg: Central Standard Time?

The Witness: I can't tell you. I don't think it would

have been Daylight Saving ime in December.

Mr. Bury: Mr. Examiner, I wondered, I have only three or four questions of Mr. Patterson. I would assume my questions of him would be treated in the same manner that the questions by Mr. Goldberg of the Staff witnesses.

Perhaps they would like to have them before them, and to be considered with your ruling. I think I could get them out of the way in 5 minutes.

Presiding Examiner: Are they clarifying questions?

Mr. Bury: Well, yes.

Presiding Examiner: Of that nature?

Mr. Bury: Yes. To be very frank, I think they are in the nature of additional direct, in that it is a case of eliciting additional information not covered in his direct.

Mr. Goldberg: Noncontroversial?

Mr. Bury: No, they will be controversial.

Presiding Examiner: The Court will be in recess until 10 o'clock tomorrow morning.

(Whereupon, at 4:25 p.m., the hearing adjourned to reconvene at 10:00 a.m., Wednesday, May 4, 1960.)

WEDNESDAY, MAY 4, 1960

The above-entitled matter came on for further hearing pursuant to recess, at 10:00 o'clock a.m.

BEFORE:

HARRY W. FRAZEE, Presiding Examiner.

APPEARANCES:

(As heretofore noted.)

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PROCEEDINGS

Presiding Examiner: The hearing will come to order, please.

Are there any preliminary matters this morning?

If not, Dr. Sorensen.

Mr. Bury: Excuse me.

Presiding Examiner: Mr. Bury?

Mr. Bury: I was just wondering if it might not be more convenient for me to proceed to ask what questions I have of Mr. Patterson so those will be in the record if the other parties wish to cross-examine on that testimony. That was my only thought.

Presiding Examiner: Well, if they are in the nature of direct testimony, yes. If they are in the nature of clarifying questions or cross-examination, let us wait until we come to it. You be the judge.

Mr. Bury: Fine. Thank you. We will wait.

Presiding Examiner: You have been sworn, Doctor.

Whereupon,

ROYAL W. SORENSEN

resumed the stand and testified further as follows:

Presiding Examiner: Mr. Everett, are you going to lead off with the cross-examination?

Mr. Everett: I will, yes sir.

Presiding Examiner: The witness is yours when you are

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ready.

Mr. Everett: Mr. Bury, do you have a copy of the transcript that Dr. Sorensen could examine?

Mr. Bury: Yes, I do.

Is it your thought that it would be helpful if Dr. Sorensen had a copy of the transcript with him?

Mr. Everett: Yes. I need mine. Otherwise I would——

Mr. Bury: Just a moment. We have a second copy so I will have one available also.

Mr. Everett: Thank you.

Mr. Bury: Doctor, do you have a copy of your testimony before you?

The Witness: Yes.

Mr. Bury: He has it already.

Mr. Everett: It is the transcript, though——

Mr. Bury: Yes, he has a reproduced copy of the transcript with him of his testimony.

Mr. Everett: Oh, I am sorry. Thank you.

Are the pages on that, Mr. Bury, the same as the page numbers in the transcript?

Mr. Bury: Yes. They are photographic reproductions.

Mr. Everett: Thank you.

Cross-Examination

By Mr. Everett:

Q. Dr. Sorensen, referring to your testimony on page

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140 of the transcript, there appears to be a word or a phrase missing between the word "four" and the word "ago" on lines 20 and 21.

Mr. Goldberg: What page is this?

Mr. Everett: This is page 140 of the transcript.

The Witness: Four years ago—y-e-a-r-s—years.

By Mr. Everett:

Q. Thank you, Doctor.

Have you been regularly employed by Edison during the last four years? A. Yes. On an entirely different program, a program of air pollution for power plant stacks.

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Q. When was it that you addressed yourself to the problem involved in this proceeding? A. Late in November of last year.

Q. Dr. Sorensen, in your direct testimony you stated that you had a knowledge of the area involved in this proceeding, is that correct? A. That is correct.

Q. And I believe that you also stated that your knowledge of this area antedated the ownership by the Edison Company? A. That is correct.

Q. And would that be the period between 1912 and 1917? A. That is correct.

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Q. When you acquired this knowledge? A. That is correct. That was my first time.

Q. And at that time you were employed by Pacific Light & Power Company? A. Pacific Light & Power, which was purchased by the Edison Company, I believe, in 1917.

Q. And did the Pacific Light & Power Company operate the Highgrove Substation at the time you were with that company? A. Yes. They had a substation by that name.

Q. Well, is that the same substation that has been described and testified about? A. Same location and name. It is not the same station by any means.

Q. But it is not the same station? A. No, it couldn't stay the same over the years.

Q. And Pacific Light & Power Company served the Highgrove area? A. They served all that area around that.

Q. Did Pacific Light & Power Company operate the Pedley Substation? A. Yes.

Q. And Pacific Light & Power Company also serve the Pedley area? A. That area around there. Largely agricultural

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at that time.

Q. Now, what about the Colton substation? Did Pacific Light & Power Company operate that substation? A. I don't remember specifically. They furnished power in that area.

Q. Pacific Light & Power Company, you say, did serve Colton area? A. That is right.

Q. And did Pacific Light & Power Company sell electric power and energy to the City of Colton? A. I am not sure as of what date that was. I would have to look up the record.

Q. I think you testified already, Doctor, that it was in 1917 that the company now known as Southern California Edison Company acquired Pacific Light & Power Company? A. I believe that is the date, yes.

Q. So before that date, before 1917, Southern California Edison Company was not serving the Colton area or—— A. The Edison Company did not have that part of the system we are discussing. That was Pacific Light & Power system. I am not sure about the exact towns in every case. I would have to look that up.

Q. Well, did the company now known as Southern California Edison Company operate this Colton substation

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during this 1912 and 1917 period? A. I am not sure. I haven't looked that up to check my memory.

Q. Well, then, you don't know whether Southern California Edison Company was selling energy at wholesale to the City of Colton during this period 1912 to 1917? A. I do not have that in mind. There were three companies operating in that area, Pacific Light & Power Company, Southern California Edison and what is now the California Electric Company. The exact spots that

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they served is not clear in my memory, although I do have records of that in my files which I have at home.

Q. Well, assuming that the Southern California Edison Company was serving the Colton area during 1912 and 1917, why would you as an employee of Pacific Light & Power Company have a close personal knowledge of the Edison system in that area? A. I would have a knowledge of what was going on in that area at that time because that was part of my work with Pacific Light & Power. However, I can't claim to remember all of those details this length of time and I haven't looked up the records.

Q. Well, Dr. Sorensen, if Southern California Edison Company and its predecessor, which is named, I believe, Edison Electric Company, whose properties Southern California

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Edison Company acquired in 1909 have been selling electric energy at wholesale to the City of Colton since 1905 as testified to by Mr. Ashley, and you commenced your employment with Pacific Light & Power Company in 1912, how did you acquire at that time a close personal knowledge of the Colton area long before Southern California Company owned the electric system serving that area? A. It is right there. It is in the same general location. Driving about that area, one gets acquainted with all that goes on.

Q. But, sir, the Southern California Edison Company or its predecessor was already serving the Colton area prior to the time that you became associated with Pacific Light & Power Company? A. That is correct. Probably so. If Mr. Ashley said so, he has records.

Q. I believe, sir, he did testify that this electric service—— A. I didn't hear his testimony, nor read it either.

Q. I believe that was his testimony, that this electric service by Southern California Edison to the City of Colton dates back to 1905? A. I don't know.

Q. Dr. Sorensen, in the years since 1917, has there been a substantial growth in the electric utility business?

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A. Has there been what?

Q. A substantial growth in the electric utility business? A. Very much so. It has doubled approximately every ten years.

Q. Do you recall the approximate generating capacity of Pacific Light & Power Company in 1917? A. They had the Big Creek system, several stations completed. They had a station at Redondo that was a steam power station.

They had a station up Kern River. That is as much as I recall immediately.

Q. Do you recall what that approximate generating capacity was in terms of kilowatts? A. The early Big Creek stations had two power houses with thirty thousand KVA in each one. Each power house had two, 15,000 KVA generators. That was their large hydro station.

They had some stations scattered around Southern California, small ones and they had some stations up Kern River, above Bakersfield, Borrel Station I believe one was called.

Q. Do you recall what the approximate total generating capacity was of all those facilities you have mentioned? A. I do not. I would have to guess. At Redondo

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they had three 5,000 KVA reciprocating engine systems and two turbines, about 12,000 KVA each.

Q. Hoover Dam was not in existence in 1917, was it? A. It was not.

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Q. And the electric power that is available to Southern California Edison Company from Hoover Dam is greater than the generating capacity of Pacific Light & Power Company at the time that you were in its employ, is that not correct A. Very much greater.

Q. Do you happen to know what the generating capacity of the Edison system is today? A. Offhand, it would be quite a guess. It is up somewhere—you would figure millions. Again, that is a matter of record and not a matter of memory.

Q. Would you agree, Doctor, there has been a substantial grown (sic) in the electric utility business in the Colton area since 1917? A. There has. Not equal to that of some other parts of Southern California.

Q. Well, would you say that your knowledge of the operations of Pacific Light & Power Company in 1917 would result in your being familiar with the operations of the Edison Company in the Colton area in 1959? A. Not to the degree—you might call it an obser-

vation. I prepared quite a program of the history of the eleven western States about the end of 1930, published a book, was really author of a book published by a man by the name of Malone. At that time I went over the whole program in that area and wrote it down. That doesn't mean I can recite it offhand. I would like to claim that kind of a memory but it isn't there.

Q. Dr. Sorensen, where is the electric power generated which Metropolitan Water District delivers to Edison Company? A. They have a contract with the Government for a large amount of power from Hoover Dam and they have a tie-in with—not with Davis—Parker Plant. Is that what you call it down there? That was the arrangement. I think about one-third of the power, if I

remember rightly, from Hoover Dam, can be claimed by Metropolitan Water District, maybe more.

Q. When you say "they" you meant Metropolitan Water District? A. Metropolitan Water District.

Q. Where is this electric power that is delivered by MWD to Edison Company metered? A. Where is what?

Q. Where is this electric power metered that Metropolitan Water District delivers to Edison Company? A. I don't know.

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That doesn't mean I haven't seen those stations—not within the last year or two.

Q. Yes, sir.

Dr. Sorensen, you testified concerning load flows and load flow studies. Would you explain to me, a non-engineer, what you mean by those expressions? A. I mean by load flow study that we used methods of determining what load goes by certain points and the direction in which it goes through those points. If I had a load study to make, I would go to a calculating board and have the board set up to represent the system, perhaps nearly the entire system, at least so there was no doubt as to how load flow for any of those points could be checked.

Then I would go over the calculating board with the experts who do meter work and operating and check and see if it was all right and follow their observations. There are practically no power systems with enough meters on the system that can be read simultaneously to indicate a load flow in the system as it exists actually when you have a large network.

Q. Well, I heard some of the engineers refer to power flows. How do they differ from these load flows that you mentioned? A. Well, the difference between power and load is nil, at least it depends on the wording. We have energy

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flow. We have power flow. Power flow is at an instant. Energy flow is over a period of time. We have current flow. If you have current flow and voltage you have power flow. That could be load flow if you like.

Q. Dr. Sorensen, I believe that in your direct testimony you used the phrase "transmission line phenomena."

What do you mean by that? A. I mean anything that occurs in transmission lines that is characteristic of the line.

Q. Dr. Sorensen, do you consider that you are more familiar with the operation of the Edison Company system than one of the company's dispatchers? A. No.

Q. Are you familiar with the policies of Edison Company in dispatching its operations? A. I think so.

Q. Well, would you briefly outline those policies? A. Well, the Edison Company has a large system. It operates with a chief dispatcher. That dispatcher has charge of everything on the system in general. However, there are conditions set up where people can deviate from that dispatcher's general authority if emergency comes and do certain things in sections to avoid dropping load and things of that kind.

Now, if you were to ask me what each regulation is that the

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dispatcher has in front of him, no, I have never read all those regulations and don't think it is essential that I know them to have discussed the part of this program which I was employed to discuss.

Q. Dr. Sorensen, is a watt hour meter used to measure the flow of electric power on alternating current systems?

(431-A)

A. Watt hour current systems are used to measure the flow of energy on any electrical system.

Q. Well, that would include, then, a direct current system as well as an alternating current? A. Watt hour meters can be used on direct systems but not the same meters that are used on AC systems.

Q. Now, in regard to a watt meter as distinguished from a watt hour meter, would that be used to measure the rate of flow of electric power on alternating current systems A. A watt hour meter measure (sic) the momentary power going through that point.

Q. Excuse me, sir. I was inquiring about a watt meter. A. A watt meter measures the momentary flow going through that point.

Q. That is the rate of flow? A. That measures power, not energy.

Q. It measures the rate of flow, the watt meter would?

431-A

A. That measures the rate of flow.

Q. And would that also be true of a direct current system? A. A direct current watt meter, yes.

Q. Well, in measuring the rate of flow of electric power on a direct current system, is the value that is shown by the watt meter equal to the product of voltage across the two lines in the circuit multiplied by the current in the line? A. If the meters are correct, yes.

Q. And in measuring the rate of flow of electric power in a single phase alternating system, is the value shown by the watt meter equal to the product of the voltage across the two lines of the circuit multiplied by the current in the line, multiplied by the power factor? A. Yes.

Q. I think that you have testified, Dr. Sorensen, that in your long experience of over fifty years that the watt

(431-A)

meter in the alternating current system was puzzling to the electrical engineers of the day when alternating current became available? A. From 1900 up until 1910 in my experience, I have often encountered men in charge of power systems in the area where I was who were completely puzzled by watt meters but knew very well what DC meters did.

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Q. Is the watt meter principle the same for both alternating and direct current systems? A. I don't get that question.

Q. I am sorry, sir.

Isn't the watt meter principle the same for both the alternating and direct current systems? A. Yes. They are not all designed the same way. You can have some watt meters that work on one and not on the other accurately.

Q. Well, were the electrical engineers whom you just mentioned, being puzzled, were they also puzzled by the watt meters used in the direct current system? A. Didn't use watt meters in direct current system. They used watt hour meters but not watt meters.

Q. What was the thing that was puzzling these electrical engineers whom you referred to? A. Knowledge of power factor and reactance and the impedance equation. It had been developed in 1893 by Dr. Kinnelly, but engineers at that time that I am speaking of in operating power systems had grown up with DC systems and did not understand it.

In fact, some college teachers were not acquainted with AC systems because they had graduated in the years 1890 to 1900 and had nothing to do with AC systems.

Q. Dr. Sorensen, were you taught alternating current

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theory when you attended the University of Colorado about 1900, 1901? A. I studied alternating current at the University of Colorado under H. B. Dates, who was a graduate of MIT.

In fact, my partner and I developed the first thesis in that area on the control of system by adjusting the fields of synchronous motors.

Q. And that was about 1900, 1901? A. I entered the University of Colorado in February 1902 as a freshman and graduated in June 1905, three years and a half.

Q. You took an accelerated course? A. Much to my regret later. The professors allowed me to get away with murder and take courses out of turn.

Q. Would you agree, Dr. Sorensen, that the first alternating current system in America was in operation in 1886 in Great Barrington, Massachusetts? A. I am not familiar with that that early. My first recollection of AC comes in connection with the World Fair, 1893 and that is largely by virtue of having read what went on when the Westinghouse put on that display.

Q. Thank you.

Dr. Sorensen, I believe that you have testified that a postulate is a theoretical possibility which is assumed to be correct for the purpose of solving a problem. Is that

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correct? A. I wouldn't say it is entirely a theoretical possibility. It is a possibility or a probability that can be developed from the knowledge of a system. You can say this kind of a thing would operate correctly on this system.

Q. Dr. Sorensen, you testified that with respect to postulates that were used by Mr. Miller that you could propose equally logical postulates. Now, one of his postu-

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lates was, was it not, the electric energy entering any section of the circuit, except for the losses in that section, must be equal to the electric energy leaving that section of the circuit? A. That is a fact. That is not necessarily a postulate.

Q. And wasn't another one of the postulates which Mr. Miller used that when a conductor of the types and sizes which is made use of in the transmission system is carrying energy in one direction there can be no flow in the reverse direction? A. I don't know. That is not a positive statement. There can be flow in both directions in that circuit.

Q. But one of Mr. Miller's postulates was the one which I just stated, was it not? A. I am not sure.

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Q. Well, when Mr. Roos asked you if you could say that there were equally logical postulates to those proposed by Mr. Miller, I believe that you answered in the affirmative, so I got the impression that you understood what Mr. Miller's postulates were. A. That probably was a general answer.

When one draws the kind of diagrams that I saw in the exhibits and you have a bus bar to which there are several incoming connections in so long as you adjust the arrangement of those connections, insofar as you assume them, you can assume that certain portions of the power go down any one of those lines out as they come in as you choose.

In other words, if I have two lines feeding in, I can say part of it from line "A" goes into circuit "X" going out; I can say part of "B" goes into circuit "X" going out. If circuit "A" is big enough to supply the whole business I can say all of it comes from "A" with equally logical thought as to say it is divided.

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That is a matter of setting up your bus and drawing it out. In nearly every case one can draw more than one series of flow lines for incoming buses with incoming leads more than one and outgoing leads more than one.

Q. But, sir, one of the postulates upon which Mr. Miller's diagram was based was this one which I last stated, that when a conductor of the types and sizes made use of in

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a transmission system as carrying energy in one direction there can be no flow in the reverse direction, that that was one of the postulates? A. That may be correct for that specific problem. It may not be for some other problem. It may not be for that one on careful examination.

Q. You do agree, sir, that that postulate that I have just stated was that upon which Mr. Miller's diagram was based? A. With the things I have in mind, yes. My main objection to Mr. Miller's exhibit is that he didn't take enough of this system into account. He just had one little bit of it without accounting for enough of the system to make a proper analysis, in my opinion.

Q. And another postulate which Mr. Miller made in connection with his diagram was that when energy from different sources is supplied through a common point to two or more loads, then the relative proportion of the energy from each source in the supply and in the deliveries to each load will be the same? A. That has never been proven.

Q. But that was one of the postulates that he used in this diagram? A. That has never been proven. If you have enough power in one source to supply both places.

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Q. But that was one of the postulates, sir, which he used in preparing this diagram? A. I think so.

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Q. Thank you.

Dr. Sorensen, when you were asked about the significance of the order of connection of circuits on buses, you stated that it had no particular significance, is that correct? A. That is correct, except for convenience of operators.

Q. Suppose, Dr. Sorensen, that a switching station or a substation with connections to supply circuits and also to load circuits, suppose that these connections were spread along the length of the bus and a section of the bus was loaded to the permissible current rating and assume further that there were equal power factors on all the loads. Now, if the bus were rearranged so that all the incoming supply circuits were placed in sequence at one end of the bus and all the outgoing circuits were placed in sequence at the other end of the bus, would there be any adverse effect as a result of that arrangement on the center section of the bus? A. Not necessarily. A little more loss in the bus probably, but the loss in the bus is rather insignificant, usually.

Q. Well, wouldn't the permissible current rating be exceeded under those conditions?

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A. That depends on your design.

Q. One of the assumptions which are made in the question, of course, was that the bus was loaded to the permissible current rating. A. Well, permissible current rating means a little bit of temperature. It doesn't mean you are going to burn up the bus or anything like that. They design the bus to operate at some low temperature and they like to have it operate that way. I dare say that most buses by the time they get overloaded are operating a little bit warmer.

Q. Under those suppositions which I made, Doctor, in that question, wouldn't the bus be overheated? A. No,

not especially overheated. The matter of temperature is very low on a bus. Normally a rough figure we use is that we don't like to have more than a thousand amperes per square inch in a bus because the losses go up but you could have a lot more than that and it wouldn't get very hot, unless you had a bad connection.

Q. Dr. Sorensen, turning to page 169 of the transcript, you spoke there of this form of vector analysis. I believe you were also asked how it differed from the single line diagram, and I have read your long answer on page 170. I admit that I don't understand it. Could you clarify it for a layman, a non-engineer? A. Well, I am perhaps not as good a teacher as I think

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I am or I would have made it clear.

Q. Well, then, your testimony, Doctor, with respect to vector analysis, description of vector analysis and the distinction between that and the one line diagram, you wish to be as stated on page 170? A. I have page 170 here.

Well, they do two different things. One line diagrams are made to represent the physical aspect of a system. Vector analyses are used in various degrees and various combinations to tell us what happens to the electrical energy that is flowing in the system. The one line diagram is, well, what will I say, you draw a picture of a house that shows the house. That doesn't tell you what people in it are doing. Vector analyses tell us what the electrical energy in the system is doing.

Q. Referring again, Dr. Sorensen, to page 170 of the transcript, particularly lines 12 to 22, you appear there to be objecting to the fact that the flow diagrams are changed by the rearrangement of the circuits.

As a matter of fact, for each rearrangement, wouldn't a diagram prepared directly from the readings of watt

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meters placed at appropriate points on the system agree in amount and direction of flow with a diagram prepared in accordance with Mr. Miller's method? A. What is flowing in an outgoing circuit is determined

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by the load on the circuit and not by its position on the bus. What is determined by an ingoing circuit, the same way is determined by the supply from that circuit and not by its position on the bus.

Q. For each arrangement wouldn't a diagram prepared directly from readings of watt meters placed at appropriate points on the system, wouldn't those readings agree in amount and direction of flow with a diagram that was prepared in the manner that Mr. Miller prepares diagrams? A. That depends on where you put the watt meters. If you put the watt meters on the incoming lines and the outgoing lines, they will not show an appreciable difference, no matter how you move them on the bus.

Q. Suppose you put the watt meters on the sections of the bus? A. If you put the watt meters on the sections of the bus, it might possibly make a difference in direction through that bus. On the other hand, if you have several lines coming out, you can still apportion the outflow the way your meters on the lines read.

Q. Suppose you put a watt meter at every place where Mr. Miller's diagram has a figure. Would the diagram agree with his figures? A. I couldn't answer that without having something to look at.

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Q. Dr. Sorensen, the electric power and energy for this building we are in now is supplied by the Potomac Electric Power Company which is interconnected with electric

utilities operating in New Jersey and Pennsylvania and Maryland. Now, would it be just as reasonable to assert that the individual lights in this room were lighted by electric energy generated in different generators in these various states—would that be just as reasonable as to assert that all the lights in this room were lighted from the same generator or from the same combination of generators? A. That question can't be answered generally.

Q. Well, as to the two alternatives, would one be just as reasonable as the other? A. That is an analysis problem. If you have a network system, you can't make any general assumption like that—not technically. I don't know what you do in a business way.

Mr. Goldberg: He didn't know what you did in a business way.

By Mr. Everett:

Q. Then it cannot be determined whether one of those assumptions is as reasonable as the other? A. It cannot. They are not determinable.

Q. Now, suppose we had a floor lamp, Dr. Sorensen, and the lamp contained three bulbs and it is connected by a cord

to an outlet. In that situation, would you agree that the proportion of energy from various sources is the same for each of the lamp bulbs? A. If the lamps are tied to the circuit at that spot, each lamp takes its share of the current at that particular point, yes. But that doesn't tell you where that current comes from—where the source of that current is by any means.

Q. Each bulb wouldn't necessarily receive its energy from the same source—each of these three bulbs now?

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A. They would receive their energy from the same nearest connection to the system, yes, whatever is there.

Q. Well, would they receive their energy from the same source? A. Not necessarily. You can't tell what generator that energy comes from on a system, if that is what you are getting at. That is utterly impossible.

Q. Well, then, the source of energy for each bulb could be different then? A. For each of the bulbs?

Q. Yes, for each of the three bulbs. A. No.

Q. It would have to be—— A. Not at that point.

Q. At that point, the source would have to be——

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A. The source is entirely camouflaged by the time you get there and buried from a point that you can't go back of that.

Q. Well at this point—— A. At that particular point, it would be reasonable to assume that you were so near a single element that they might come from the same source. You couldn't prove they do, because you don't know how to put tags on electrical energy after it gets in the system. That can't be done.

Q. Well, then, you can't say that the energy might not come from three different sources then? A. I cannot prove that it does not, no. I can't prove that it does, either.

Q. Would your answer be any different if you were asked to solve this problem by use of the vector analysis? A. No, because when electric energy passes a point and goes into a pool, it loses its identity. You can work your vectors up to that point, you can work them beyond that point, you can't work them through that point.

Q. Dr. Sorensen, would you define the word "quantum"? A. Well, if I buy a load of ten horse power

that is a quantum. It is a slug, or whatever you choose to call it.

Q. Do electrical engineers normally use the word "quantum" as a measure of electric energy? A. No, not as a measure.

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Q. When you say not as a measure, that implies that they do use it in some way, though? A. I have used it in the classroom. Men who study physics these days or chemistry are accustomed to the use of that term.

Q. For what purpose? A. What is that?

Q. For what purpose, to show what, to explain what? A. Designating some kinds of a unit that they are talking about. You want to give a package, a bucketful, what have you.

Q. Does this word "quantum" have a specific value in physics? A. No.

Q. You just told us that quantum is not a word commonly used by electrical engineers. What unit of electrical energy is commonly used by them? A: Watts, watt hours, power factor, amperes, volts, reactance, energy component, positive phase currents, negative phase currents, zero phase currents, primary and secondary reactances, all sorts of things.

Q. Well, then, this word quantum which you used in your testimony is primarily an expression that you reserve for the classroom then?

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A. That is right. It expresses to me a clear idea.

Mr. Everett: No further questions, Mr. Examiner.

Presiding Examiner: We will take the morning recess at this time.

(At this point, 11:10 a.m., a recess was taken until 11:20 a.m.)

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Presiding Examiner: Mr. Goldberg.

Mr. Goldberg: Mr. Examiner, before I put the few questions that I have of Dr. Sorensen to him, I wonder if we could at this time advert to the matters we were discussing at the close of yesterday's session.

At that time of course no transcript was available, but I have the transcript now, and I would like to make several motions to strike.

Presiding Examiner: This is a good time as any to get them in the record.

Mr. Goldberg: All right.

I would move to strike the question appearing at lines 19 and 20 of Transcript 393 and the answer to that question which begins at line 1 of Transcript page 401 and goes through line 11 of Transcript page 403. This of course relates to Exhibit No. 29.

I think the Examiner reserved ruling on the exhibit itself.

Presiding Examiner: And indicated, I think, that if the

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exhibits fell, why the testimony did likewise.

Mr. Goldberg: The testimony would go with it, yes.

And I think I have already stated fully our objections to the exhibit.

I would also move to strike, and do, lines 11 through 20 on Transcript page 412 and lines 3 through 14 on Transcript page 414. The last two references relating to Exhibit No. 30.

While I am making motions to strike, I would like to move to strike beginning with line 7 on Transcript page 297 and going through line 1 on Transcript 298. This latter motion to strike refers to testimony given by Mr. Montgomery in connection with Exhibit No. 16 which, when later offered, was rejected.

Mr. Bury: Does that accomplish your motion?

Mr. Goldberg: Yes.

Mr. Bury: Those are all the items.

Mr. Frazee, just in this same connection, I would like to mention at this time, because we did not have the benefit of that Shamrock Oil decision at the time we were here at the last series of hearings and which we think is pertinent now, I think it might be appropriate in connection with the testimony and exhibits offered by the California Commission and on which a motion to strike has been made by Mr. Goldberg, it might be appropriate at this time for me to move to re-offer Exhibit 16 so that it may be included within

your ruling when made to complete all of this testimony and exhibits on this subject at one time.

In other words, if you were to deny the motion to strike with respect to Exhibit 29 and Mr. Patterson's testimony with respect thereto and would not strike Mr. Montgomery's testimony with respect to Exhibit 16 and consistent therewith would receive Exhibit 29, we would like also of course to have Exhibit 16 received at this time.

Presiding Examiner: Mr. Bury, all that 16 or 19 show, as I recall, is the fact that a certain amount of energy comes to Edison from Hoover Dam. Isn't that correct?

Mr. Bury: I think that is correct, that Exhibit 16 shows the relationship between Edison's total system generation and the various sources, including energy from Hoover in tabular form, and in essence Exhibit 29 shows the same thing in graph form.

Presiding Examiner: But there isn't any question, I gather, from what your witnesses have testified to and

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what the Staff has testified to and what the California Commission admits that some energy comes to Edison from Hoover and Davis Dam?

Mr. Bury: I believe that statement is a little too broad. We certainly have admitted that Edison receives into its system energy generated at Hoover Power Plant.

Presiding Examiner: From Hoover?

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Mr. Bury: From Hoover. We certainly do not concede that any energy from Davis proceeds to Edison system.

Presiding Examiner: Do you get any from Parker?

Mr. Bury: We have in the past, yes.

Presiding Examiner: I think I misspoke myself when I said Davis. I should have said Parker, I think.

Well, thank you for that, and certainly if 29 were to be admitted, well, then, obviously 16 ought to be also.

Mr. Bury: I simply wanted to make the formality of re-offering it at this time.

Mrs. Pajalich: Mr. Examiner, may I point out that Exhibit 29 shows not only the amount of energy coming in from Hoover but also shows the relationship of that amount to the total generated within the Edison system and also shows the miniscule amount of total energy which is sold to the City of Colton.

Presiding Examiner: I understand it is the California Commission's theory that the amount of energy coming from Hoover is so small that this Commission ought not to recognize it at all?

Mrs. Pajalich: It is the position of the California Commission, Mr. Examiner, that in line with the decision of the United States Supreme Court in Connecticut Light & Power Company, if this Commission should assert its jurisdiction in this proceeding, which it has not done as yet, then it would

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have jurisdiction to exercise its administrative discretion not to take jurisdiction over such a trivial flow of interstate energy.

Presiding Examiner: Yes. That is what I understood your position to be.

Mr. Bury, do you wish to be heard any further on Mr. Goldberg's motion to strike?

Mr. Bury: The only comments that I have to make are somewhat in response to remarks Mr. Goldberg made toward the end of the day. That is, in considering the Connecticut case and in considering Opinion 332 of this Commission, last November, in the Shamrock case, I think it is important to point out the distinction in the consideration of the issue of de minimis by this Commission from the consideration of de minimis by the courts. I think there is a very marked distinction and I think that in effect what the Connecticut case says, that while the issue of de minimis may be raised before the Commission and it may weigh those facts on the trivial amounts of interstate power, determining whether or not it may wish to decline to regulate, if the Commission determines that the matter is not de minimis, having had those facts before us and decides to go ahead and regulate, that the issue cannot then be raised in the courts.

The only other comment I wanted to make with respect to the Shamrock decision—there certainly was some talk

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about the facts in the Shamrock case as compared with the facts in this case. It certainly would not be my intention in citing the Shamrock Opinion as being a precedent on this case, but as useful to us as merely an expression of this Commission's recent interpretation of its own powers under the Connecticut case.

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Presiding Examiner: Mr. Goldberg.

Mr. Goldberg: I don't want to go over the ground that we have been over several times, but I do want to underscore that one of our objections runs to the proposition that even if the de minimis issue were properly in the case, that this exhibit may not be received on that point because it proves nothing about that issue.

It assumes, for example, that all the very many sources of supply on the system do and/or could be used to supply the City of Colton's load, and there is no evidence in this record that the generating sources on this system, some of those sources which are reflected in this total that you see on Exhibit 29, could possibly get by the load centers which obviously those generating sources are designed to serve. That is just as plain—it is obvious from the exhibit presented by the California Commission's witness himself.

Notice on Exhibit No. 26 he sets forth the major production facilities serving the San Bernardino area. He

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does not purport to say that all of the generating sources on the system supply that area and particularly supply the City of Colton.

I would certainly like to have the company or the California Commission put a witness on to testify to that fact and we would be delighted to cross-examine him on it.

Mrs. Pajalich: Mr. Examiner——

Mr. Goldberg: If you are going to deal with this issue of de minimis properly, it is our position that you must deal with it with respect to the production facilities that you demonstrate serve this area and you will find that under those circumstances that the amount involved is by no means de minimis by any standard.

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Mrs. Pajalich: I note in the transcript at page 45 that even Mr. Miller of the FPC Staff testified that some of the energy, that is, referring to the energy coming from Hayfield, was transmitted by Edison to Colton. Where did the rest of the energy come from? It must have come from an intrastate source which Mr. Goldberg apparently doesn't concede.

Mr. Goldberg: If I were to concede that it came from an intrastate source, I still say demonstrate that source and obviously there isn't any engineer that the California Commission or the company can produce that would testify that some of the generating sources of this company, that the supply from those sources could conceivably, in view of the

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loads intervening between Colton and those sources, reach Colton.

Mrs. Pajalich: We do not concede that the burden is on the California Commission in that respect, Mr. Examiner.

Mr. Goldberg: When you come in with an exhibit, the burden is on you to support it.

Presiding Examiner: I will rule on it tomorrow morning, or if not at ten o'clock, then I will at two o'clock.

Ar you ready to cross-examine, Mr. Goldberg?

Mr. Goldberg: Yes.

Cross-Examination

By Mr. Goldberg:

Q. Mr. Sorensen, I would simply like to get a number of matters clear for the record that remain, at least in my mind, in a state of confusion.

For example, I had secured the impression in your direct testimony that the vector analysis was a means of tracing electrical energy and identifying load and source,

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but as I understand your testimony on cross-examination today, it cannot be used for that purpose. Is that right? A. No. I didn't intend to say it cannot be used for that purpose. I mean to say that we cannot solve alternating current problems without the use of some form of vector analysis if they are complicated in any way.

Now, what I do mean to say is this: that we generally

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recognize that in handling a vector quantity to represent electric energy, or electric power, that when the electric energy or electric power which that represents as a vector passes through a point into a system, it loses all of its identity. That is a definition of the vector system that we use right along.

Q. In other words, you are saying that you can identify through vector analysis the source and load within limits on a network system? A. You can identify it where it comes into the system. You can't further carry that to identify where it goes in a network.

Q. In other words, you can only trace it down to the point where it enters the network, but beyond that the vector analysis doesn't help you? A. That is correct.

Q. Well, you are familiar with the fact that using the calculator board Mr. Sample for the company has made certain studies in this case? A. I have seen the calculating board and I have seen Exhibit 11.

Q. Would you call Exhibit 11 a vector analysis? A. No. Not exactly. That is a laboratory study.

Q. I gathered from your response to the question regarding the source of electric energy for the three bulbs

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in that lamp—— A. I would like to add one sentence: if I were required to do so, I could take Mr. Sample's results and draw a vector system for it.

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Q. I see. You are adding to your previous answer? A. Yes. Those results can be transferred into a vector system.

Q. You haven't been asked to do that in this case? A. What is that?

Q. You haven't been asked to do that in this case? A. No, and I would take quite a bit of time to do it because there is a lot in that.

Q. Now, to get back to my question—let me re-state it: in putting the illustration to you of a lamp with three bulbs and asking you about the source for those three bulbs, I think you said that it would be in the circumstances of that illustration reasonable to conclude that the same source was supplying the three bulbs, is that right? A. The same bank or pool, if you please, from which we draw that energy supplies those three. What went into that pool from this or that or the other place, I couldn't see any evidence that I could say what went into that pool from which that is drawn.

Q. Would this be a fair statement: that you have testified here that as a matter of physics you can't identify the

kilowatt hours, but that in given circumstances, it may be possible to draw reasonable inferences with respect to sources supplying particular loads? A. Yes. Under some circumstances that would be true.

Q. Yes.

Now, then, would it not be fair to say, also, that your function in this case was not to test the details of the assumptions and analyses made by others. Those details, I think you testified on your direct, you left to others more familiar with the detailed operations of the system. Is that right? A. There were two reasons why I did

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not do the kind of thing that was done yesterday on the witness stand. One reason was so little time before December hearing here passed between the time the Edison Company asked me if I could do something, it would have been impossible to do that sort of thing. It takes a lot of long, hard work to do what was done yesterday.

Now, my reference to the fact that others would do it came from the fact that Mr. Bury said to me, "We are not asking you to describe the details of the circuits of this system." So, all I did was make enough general study of this file that we have here to convince myself that in my mind there is not sufficient data there to identify power coming

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from the Hoover Dam source and going to a particular place in the Edison system because enough circuits have not been included in the study.

Q. When you said "here or there" in referring to something, you were referring to the single line diagram placed in evidence in this case by the Staff Witness Miller? A. And my study of that file.

Q. I see.

For the sake of the record, I would like to be specific about what you were referring to when you said what was done on the stand yesterday. Are you referring to the testimony of the California Commission's engineer? A. I am.

Q. To any particular exhibit that he presented? A. No. He made a detailed study of the system and recited on that study.

Q. I see.

Now, in speaking of the vector analysis during Mr. Everett's cross-examination, I think you said that the vector analysis tells us what is happening to the electric

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energy flowing in the system, what the energy is doing, I think were your words? A. That is right.

Q. Could you explain to me what you mean when you

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say that the vector analysis tells us what is happening to the electric energy? A. Well, that word "happening" covers a lot of meaning. I mean if we take the simplest vector we have a single phase circuit involving resistance, reactance, voltage and current. We have to draw what is commonly called a vector to show on a diagram the relationship between voltage, current, and energy as we assume their positions. That is not a true vector, but we call it such. It is more a complex quantity solution as such.

We can proceed there through 1921, about, when various people put into use in a practical way the developments which a man named Stockvis partly completed in Belgium before 1914 and which were completed by Fortescue in perhaps the longest paper ever published in Electrical Engineering when he described the use of symmetrical phase components as he called them.

Stockvis didn't quite complete the problem. He got the positive sequence development expressed as a vector and the negative sequence. Both of those studies were made because the people discovered that some induction motors got too hot. Why did they get too hot?

An analysis showed that in addition to the primary energy current that furnished the power that drove the induction motor in a certain direction, there was also in the

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same system a developed contrary flowing or opposite flowing electric current which retarded the development

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and had made the circulation inside the motor that overheated the motor.

Fortescue carried that further and developed also a zero phase component which allowed us to solve a lot of transient or trouble problems on a system and that is a continued expansion of vectors.

Since then, other means have used all kinds of disposition of vectors that carries us into the solution of problems we could not then solve. That is what I mean by saying that you must handle such problems by vector analysis. It is a very technical problem and requires a lot of time to work out any of them.

Q. When you talk about—— A. Now, the one thing about a vector declaration is, which is positive and accepted by physicists and engineers, that after an electrical quantity enters a network system you cannot put any kind of tags on any part of that energy that came in and say this did so and so. It becomes a part of it.

Q. Dr. Sorensen, I just want to be sure that the answer you just made is your explanation of what you meant when you said the vector analysis tells us what is happening to the electric energy flowing in the system.

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A. That is correct.

Q. That is the only explanation that you can give us?

A. Well, I don't know what else you would want.

Q. All right, I just wanted to be sure that—— A. of course, the wires get hot if you get too much and if you get a short circuit something burns up. Now, this vector analysis enables us to determine why those things happen.

Q. In other words, when you are talking about using vector analysis to solve alternating current problems, by

problems you have reference to operating problems of equipment, for example, is that right? A. That is right. We have to plan what we want to do and what did happen.

Q. Yes.

What is the function of a dispatcher? A. A dispatcher, the same as any other dispatcher, tells the operators in the various stations what he wants done with those stations or the units in the stations. In some cases now he can even punch buttons and tell a certain generator to start or stop and make adjustments without moving out of the chair.

Q. And he starts or stops these generators? A. He has control over them.

Q. He does that to meet the demands and loads on the

system? A. To where he watches the meter on his board and he does that to meet his demands.

Q. Yes. He looks at his system and he knows that in Area "A" he needs additional supply and he, let us say he punches a button and starts up a generator at a particular source to meet the demands there. Is that right? A. Not always at the same source. He starts up some generator that isn't doing a job and he juts it on to the system.

Q. Yes. But essentially what I have stated is correct. He has to make a choice of economics at times. Is that right? A. He usually chooses the most economic generator to feed into the system.

Q. But essentially that is what he is engaged in doing, is getting the generator started to meet particular loads, isn't that so? A. Well, to meet increase in loads.

Q. In particular areas? A. Well, he doesn't start generators according to area. He feeds generators into

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the system. Not necessarily the nearest generator. If you talk about distances, there are a lot of generators nearer Colton than Hoover Dam is.

Q. Would he ordinarily pick the nearest generator?

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A. What is that?

Q. Would he ordinarily pick the nearest generator? A. Not necessarily, no. He has got a lot of data that tells him what generator to pick. He has efficiency charts. He has the system use, how much is going on in that particular station, so forth and so on.

Q. But if the closest generating source were under all the circumstances before him as economical as any other source, he would pick the closest source, wouldn't he? A. I can't answer that. I never was a dispatcher.

Q. Well, if other things were equal, closest source would probably involve the least expensive transmission. Isn't that so? A. What is that?

Q. I said other things being equal, the closest generating source would involve the least expense of transmission? A. Probably. Yes, if everything is equal. It might involve it quite well. That would depend on his line loadings. The nearest one physically might not be the nearest one electrically.

Q. That is right. He has all these problems of economics and line loadings and the like, but I say all else being equal he is going to select the closest source? A. I would agree with that.

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Now, in speaking of dispatching, on cross-examination of Staff Counsel, you spoke of the dispatcher wanting to avoid dropping a load. Would you explain that to me? A. Well, all dispatchers try to avoid dropping load.

Some malfunctioning on a system may occur which requires a dispatcher to use a lot of ingenuity to route circuits around such different ways as he has and avoid dropping loads.

Q. I see. You are talking about some operating problem which he has to try to circumvent in order to keep energy flowing to that load? A. That is right.

When I operated stations I was the dispatcher and operator and the whole business. They weren't very big then.

Mr. Goldberg: We have no further questions of Dr. Sorensen.

Presiding Examiner: Does Counsel for the California Commission have any questions of Dr. Sorensen?

Mrs. Pajalich: No, Mr. Examiner.

Mr. Bury: We have some redirect of Dr.——

Presiding Examiner: Mr. Bury?

Mr. Bury: —which will involve some additional exhibits.

We would like to distribute the exhibits.

I might explain that we are distributing to everyone

several diagrams which are identical. We propose to have values placed on each one of those as we proceed so that they will no longer be identical at the time that they are offered.

I also might further indicate preliminarily that this redirect is intended for the purpose of clarifying some of the testimony appearing at or around pages 188 through 190 of the transcript.

Mr. Goldberg: What pages were those? I missed it.

Mr. Bury: 188 to 190 and also some of the questioning this morning.

I hope this will be relatively brief.

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Mr. Goldberg: Would you indicate what questioning this morning these prepared exhibits were prepared to answer?

Mr. Bury: I think it will be self-explanatory as we go along.

Presiding Examiner: Which of these documents that you handed me do you wish marked?

Mr. Bury: Well, I think we will come to it after a question or two. All three are identical. As I say, we will insert values on them as they are identified.

Presiding Examiner: You may proceed, Mr. Bury.

Mr. Goldberg: Could I just have a moment to examine those pages referred to by Counsel?

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Mr. Bury: More particularly Transcript page 189, the questions and answers between lines 7 and 19 and I suppose also the following question which starts with line 20 of Transcript page 189 and ending on page 190, line 15.

Redirect Examination
By Mr. Bury:

Q. Dr. Sorensen, you have testified that in an electrical network there is no valid physical way to identify quantums of electric energy from a particular source of supply as being furnished to a particular load. Would you define what you meant by the term "electrical network" as used in that testimony? A. The electrical network type to which I referred is one comprising two or more loads interconnected with two or more power sources.

Q. Could you give us an illustration of such an electrical network? A. Well, these diagrams which you passed around contain two squares representing loads

which are designated as load 1 and load 2—L-1 and L-2—and two sources which are called S-1 and S-2. They could be generators and loads.

Mr. Bury: Mr. Examiner, could we have one of these diagrams given an exhibit number for identification at this time?

Presiding Examiner: Then you are going to further identify

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it?

Mr. Bury: Yes.

Presiding Examiner: I will mark the first one Exhibit 31 for identification.

(The document referred to was marked for identification as Exhibit No. 31.)

The Witness: Did you give a number, pardon me?

Presiding Examiner: Yes, 31. Doctor, they are all alike so I just marked my top one 31.

The Witness: Yes. They are all alike so far.

By Mr. Bury:

Q. I next direct you to what has been identified as Exhibit 31, a single sheet on which appears two circles bearing respectively the designations S-1 and S-2, and two squares, being designated respectively L-1 and L-2, and that each of those squares and circles are connected by lines through a common point.

Does that identify Exhibit 31? A. That is right.

Q. Doctor, does Exhibit 31 represent schematically the simplest form of electrical network as you have just defined it? A. Yes, with a one line diagram system.

Q. Doctor, although you have testified that specific electric quantums of energy in a network cannot be identified,

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are there at times circumstances which make possible a determination of the source of some portion of the energy being supplied to a particular load in an electrical network? A. Yes.

Q. Would you please explain how such a determination could be made?

Mr. Goldberg: Mr. Examiner, I would like to note the objection here that this is not redirect testimony at all. This is additional direct testimony. This witness has testified as the transcript shows, that you cannot trace electric energy. The problem confronting the Federal Power Commission is insoluble. Now, they are going to have this witness beat a slight retreat from that answer. This isn't redirect.

Mr. Bury: May I be heard, please?

Presiding Examiner: Re-state the question to me, will you? Have you got a prepared question there?

Mr. Bury: Yes.

Presiding Examiner: Read it to me, will you?

Mr. Bury: I think the essential part of the question is: are there at times circumstances which make possible a determination of the source of some portion of the energy being supplied to a particular load in an electrical network?

And I might explain that the reason for this is to overcome, I think, the generalization that was made between

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whether or not these tracing problems are always insoluble or whether or not with the facts we have in this case and under the circumstances which exist in the Edison system the problem is insoluble, and I think through his testimony he is entitled to clarify that there are circumstances under which tracing can be done if

certain circumstances exist and if you have certain sufficient information; and I think we further intend to show that those circumstances do not exist on the Edison system and the necessary information is not available.

Presiding Examiner: The objection is overruled.

Mr. Bury: I will re-state the question again.

By Mr. Bury:

Q. Doctor, are there at times circumstances which make possible a determination of the source of some portion of the energy being supplied to a particular load in an electrical network? A. Yes, at times you can.

Q. Would you explain how such a determination could be made? A. If our circuit is direct enough, we would apply Kirchoff's law, one of Kirchoff's laws which was determined by experiment. That law says the all generic sum of the currents flowing toward any point in a network is zero. In simple terms the sum of the ins equal the sum of outs. If we have

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a direct line where there are no branches off, then we can determine how the energy flows on that line.

Q. What information other than a diagram of the circuits is required to relate the loads with sources when applying Kirchoff's law? A. We do it by two ways. We have direct reading meters or by computation from the meter readings that we have. That can give us a knowledge of the amount and direction of electric energy flow in every circuit for which we have that data.

Q. Doctor, given such a network as is shown on Exhibit 31, and knowing the values of power flowing to and from the point of interconnection for each circuit element, how can we sometimes trace portions of the power in a load back to its source? A. Well, we refer to this same

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Exhibit 31, S-1 and S-2 have outputs respectively of 60 m.w.—megawatts—for S-1, and 40 m.w. for S-2.

Of course, if S-2 were not on there at all, we would know that the 60 m.w. that got up to this common point which is the bus would go to these loads, depending upon what the loads were.

In the example which we discussed these loads were 50 m.w. each.

Mr. Everett: Excuse me, may we have that example—

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Mr. Goldberg: This was 40 and 60 I thought.

Mr. Bury: I was going to do this by directing the reporter to mark Exhibit 31 by showing immediately to the left of the circle designated S-2 the value 40 with an arrow pointing toward the left and to mark opposite the circle designated S-1 the value 60 with an arrow pointing toward the left and immediately alongside each of the squares designated L-1 and L-2 the value 50 again with an arrow pointing toward the left toward the square.

The Witness: Now, we have 100 m.w. load, 60 m.w. generating capacity would not supply 100 m.w. load.

So we have 40 m.w. for S-2. The total together is 100 megawatts in flow to the point representing the bus and the two 50's are 100 megawatts outflow from the point representing the bus; Kirchoff's Law is satisfied.

By Mr. Bury:

Q. Now, Doctor, the question is, can you say which of the two sources, S-1 or S-2, is supplying the load designated L-1? A. Well, L-1 is 50 magawatts. It could be supplied all by S-1. It could not be supplied all by S-2. Suppose we take 50 megawatts out of S-1 for L-1 and we use 40 for L-1, and we take ten from 60 and get 40 plus ten equals 50.

In that case we know that some of the energy from S-1 and S-2 had to go to L-2 to satisfy it.

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Q. Doctor, just trying to trace back from L-1, is it correct to conclude that under the conditions under which the information shown on Exhibit 31, it is proper to conclude under these circumstances that L-1 must receive some energy from S-1? A. Yes.

Q. At least ten megawatts and maybe all of them? A. That is right.

Mr. Bury: Mr. Examiner, could we have the next blank diagram identified as the next exhibit in order?

Presiding Examiner: It will be marked Exhibit 32 for identification.

(The document referred to was marked for identification as Exhibit No. 32.)

By Mr. Bury:

Q. Doctor, let us now assume that instead of the values shown on Exhibit 31 that the values for the two sources of supply are transposed, that is, opposite the circle designated S-1 we put the value 40 and opposite the circle designated S-2 we put the value 60. We will not change the loads but again leave the values next to L-1 and L-2 at 50 each as is the case in Exhibit 31.

Mr. Examiner, can the reporter be instructed to so mark Exhibit 32 for identification?

Presiding Examiner: She will.

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The Witness: Do you have the 32 now? I didn't hear that.

By Mr. Bury:

Q. 32. A. And it is the same as S-1, except the sources are reversed.

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Q. The values given for S-1 and S-2 are transposed. Now, in Exhibit 32, again looking at the load L-1, can you trace any portion of the power being delivered to L-1 back to its source? A. L-1 must get some power from S-2 in this case because S-1 can't give 50 megawatts to either of the loads.

Q. Well, from the conditions shown on Exhibit 32, can you determine whether or not any part of the power going to load 1—L-1—comes from the source designated S-1? A. These power sources could divide. They don't need to stay 50 from S-2 to L-1 and 40 to L-2. They could divide otherwise. But always at least ten megawatts must come from S-2 to whichevery (sic) load is short, that is, 40 can't supply 50.

Q. Doctor, does this network which you have assumed and the values that you have here furnish us with any proof that load L-1 gets any energy from source S-1? A. Well, L-1 gets loads from S-1, you say?

Q. I was wondering if under the conditions shown on

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Exihibit 32 the network shown there and the values shown, there is any proof that the load L-1 gets any energy from the source S-1? A. Not necessarily so.

Q. Is that because S-2, 60 megawatts is adequate to supply the entire requirement? A. That is right. S-2 can supply all of the 50 at L-1.

Q. Doctor, in each of the two illustrations we have covered in Exhibits 31 and 32, in each of those cases, one of the sources was insufficient to supply the full requirements of the L-1 load. Let us assume that the values for each of the sources are increased to where these exceed the L-1 requirements. For the purpose of noting these assumptions may we have the third diagram be given an exhibit number?

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Presiding Examiner: It will be marked Exhibit 33 for identification.

(The document referred to was marked for identification as Exhibit No. 33.)

By Mr. Bury:

Q. Let us now place on Exhibit 33 opposite the circle S-1 the value "140." A. 140?

Q. 140 to the left of the circle designated S-1.

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A. I have it.

Q. And to the left of the circle designated S-2 the value "160." A. 160?

Q. Yes.

And again as was the case in the Exhibits 31 and 32, the load of L-1 remains at 50 megawatts. A. L-1 is 50?

Q. 50 megawatts.

And in order to balance our system, we increased the load at L-2 to 250. A. 250—L-2.

Q. It is true, is it not, that Exhibit 33 which we have just identified and marked does differ from Exhibits 31 and 32 in that under the values shown on Exhibit 33, each of the sources exceed (sic) the requirement of Load L-1, whereas in Exhibits 31 and 32, at least one of the sources was insufficient to meet the requirements of load L-1? A. I don't believe I have your question.

Do you want me just to discuss it, or have you asked your question?

Q. I was just trying to point out the difference in the value. A. Oh.

Q. What we had done in Exhibit 33 that was different

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from Exhibits 31 and 32, and I asked you whether or not it is true that in Exhibit 33 we have shown a condition

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where each of the two sources, S-1 and S-2, now exceed the requirements of L-1, whereas in the earlier illustration, at least one of the sources was insufficient to meet the requirements of load 1? A. That is a correct description of the situation.

Q. From the conditions shown on Exhibit 33, can you determine if any of the power being supplied to L-1 comes from S-1? A. Yes. It must do so because S-1 can't—wait. L-1 you said?

Q. The question was from the conditions shown—— A. Either S-1 or S-2 can supply all of the power to L-1.

Q. Can you determine whether or not it comes from S-1? A. No, not specifically.

Q. Dr. Sorensen, suppose in this simplified network the diagram we have been using for these three exhibits you had values only for L-1 and for the supply of S-1 but you had no values for L-2 or S-2. How would that affect your analysis? A. You do not have enough values to solve the requirements.

Mr. Goldberg: You mean you don't have enough information,

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is that what you meant to say?

By Mr. Bury:

Q. Doctor, would you repeat your answer? A. You gave me two values,

Q. The question was, if you have values only, for L-1 and S-1 and no values for L-2 or S-2, how would that affect your analysis? A. You can't complete an analysis with the amount of data given.

Q. Doctor, referring to Exhibit 33—— A. Yes.

Q. —do you have that before you? A. Yes.

Q. Can you determine whether or not the requirements of load L-1 are being supplied from S-2?

Mr. Goldberg: Is this predicated upon the absence of values?

Mr. Bury: No. I am referring specifically to the conditions shown on Exhibit 33. I find I have omitted a question.

Mr. Goldberg: I just wanted to be sure that we had—

The Witness: I don't know whether L-1 specifically gets power from S-1 or S-2 from this diagram. I do know that the 250 does not take—wait a minute—does not take all of the 300. Therefore, L-1 would—yes, L-1 would have to

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get some power from one of these other generators.

By Mr. Bury:

Q. Can you identify the 50 megawatts being supplied to L-1 as coming from either S-1 or S-2? A. Well, let's see. Here is 300. I take 250 away and—I don't know which one of them it comes from.

Q. Is there any way you can tell which one of them it comes from? A. No.

Q. It could come entirely from S-2 or it could come entirely from S-1? A. That is right.

Q. Doctor, is the simplified network which you have used in your illustration of Exhibits 31, 32 and 33 comparable to any portion of the Edison system which has been described previously in these proceedings? A. Yes. We could take a section of the Edison system and name a couple of stations and a couple of sources of supply and put those names on a diagram similar to the ones they have. We might call L-2 Chino. We might call L-1 the two transformer banks. We would call the dot the Highgrove bus. We would call S-2, Etiwanda power plant and we could call S-1 Hayfield power plant.

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Q. Well, supposing that you had such a diagram of that portion of the Edison system could you determine the

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source of the energy being supplied to the transformer banks at Highgrove substation? A. Well, I would have to take a problem with data figures to do that and now, would you like to have me choose some figures?

Q. The only question that I have really was if you had such a diagram of that portion of the Edison system and assuming that you knew all of the values for each of the circuit elements interconnected at that point, could you trace or identify the source of the energy supplying the bank load or equivalent to L-1?

Mr. Goldberg: Are you talking about transformer banks 1-A and 2-A?

Mr. Bury: Yes.

The Witness: Not with any figures I have in mind. There might be some figures. If we substituted for these names Etiwanda, Chino, Hayfield and transformers and so forth, the values we have discussed for S-1 and 2, we could, or if I took some actual values from Exhibit 1.

By Mr. Bury:

Q. Well let us assume—— A. I might or might not. I think I could not.

Q. Well, Doctor, let us assume that we have the conditions that are shown on Exhibits 31, 32 and 33 respectively. Would you indicate what conclusions you might draw with respect

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to conditions at Highgrove if you had the same load conditions expressed by each of those exhibits? A. Do you want me to put 160 on this one at Etiwanda, for example?

Q. Well, let us refer, first, to Exhibit 31. A. 31?

Q. Do you have Exhibit 31 before you? A. Do you want me to put 40 on Etiwanda?

Mr. Goldberg: Which one is Etiwanda, is it 2?

By Mr. Bury:

Q. Looking at Exhibit 31, I think you indicated this diagram was to some extent analogous with portions of the Edison system on which you could draw a comparable diagram by designating L-1 as the transformer banks Highgrove substation, L-2 as the line to Chino, S-2 as the line in from Etiwanda, and S-1 as the line from Hayfield.

Now, if on that portion of the Edison System you had the loading conditions, supply conditions shown on Exhibit 31, is it proper to conclude that the transformer banks L-1 are being supplied, at least in part, by energy from Hayfield? A. L-1 now takes 50 megawatts at transformer, that is right.

Q. That is right. A. And Chino takes 50 megawatts.

Q. That is right.

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A. Etiwanda has 40.

Q. That is right. A. And Hayfield has 60.

Q. If you have those conditions, is it proper to conclude—— A. In that condition, L-1 must take some from S-1 because you have 60 there, of which 10 are left over and only 40 from S-2.

Q. In other words, if you have those conditions on the Edison system then you could properly conclude that the banks were determining energy from Hayfield? A. The transformers would have to get power from Hayfield.

Q. If you had the conditions shown on Exhibit 32, is it correct that we could conclude from the conditions shown on Exhibit 32—— A. Then the transformers at L-1

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would not necessarily obtain power from S-1 which is Hayfield now on 32.

Q. But would have to receive some energy—— A. Must get power from S-2 because there is an excess over 50 from S-2 and we need the balance on the L-1 and L-2 of 100.

Q. Well, under the conditions shown on Exhibit 33, can you draw any conclusions under those circumstances as to whether or not the bank load, L-1, is getting energy from either one of the sources, Etiwanda or Hayfield?

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A. No. Because either one of them can supply L-1 and have some power left.

Mr. Bury: That is all the questions we have of the Doctor.

We would like to——

The Witness: Will you give me my question and answer on that, please?

Presiding Examiner: Yes, please read it.

(The record was read by the reporter.)

The Witness: I said what I intended to. That is all I have.

Mr. Bury: I have no more question (sic) of Dr. Sorensen. I would like to offer in evidence Exhibits 31, 32 and 33.

Presiding Examiner: Again I will reserve judgment until after cross-examination. Inasmuch as this does appear to be some additional direct I think that counsel for Staff and the City of Colton ought to have the opportunity to ask some questions.

The court will be in recess until two o'clock.

(Whereupon, at 12:35 o'clock p.m., the hearing was recessed, to reconvene at 2:00 o'clock p.m., the same day.)

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AFTERNOON SESSION

2:00 P.M.

Presiding Examiner: All right, gentlemen.

Will you have Dr. Sorensen take the stand.

Whereupon,

ROYAL W. SORENSEN,

resumed the stand and testified further as follows:

Presiding Examiner: Mr. Everett, do you have further questions of Dr. Sorensen?

Mr. Everett: Yes, sir, we do.

Presiding Examiner: He is your witness.

Now, this is based upon, as Mr. Bury called it, redirect?

Mr. Everett: Yes, sir.

Recross-Examination

By Mr. Everett:

Q. Dr. Sorensen, referring to Exhibit No. 33 for identification, let us assume that there was a 100 megawatts moving from Etiwanda or S-2 in Exhibit No. 33.

Mr. Goldberg: Let me understand, you are calling the S-2 Etiwanda?

Mr. Everett: Yes, sir. I believe that was what Mr. Bury in his redirect of Dr. Sorensen referred to, said that S-2 might represent Etiwanda.

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By Mr. Everett:

Q. Wasn't that correct, Doctor? A. I don't have that on Number 33.

I don't have the names on 33. I have L-2 and L-2 (sic) and S-2 and S-1, with the figure on L-2 of 250, L-1 a figure of 50, S-2, 160, and S-1, 40. That is all I have on this copy.

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. Is that different from the others?

Q. Well, referring Dr. Sorensen, to Exhibit No. 33 for identification, let us assume that there was moving from S2 100 megawatts and from S-1 there was moving 60 megawatts and that at that time the load of L-2 was 50 megawatts and the load at L-1 was 116 megawatts? A. Let me have the figures again.

Q. Yes, sir.

100 megawatts moving from S-2. A. All right.

Q. 61 megawatts moving from S1. A. All right. 60?

Q. 61. A. 61.

Q. 50 megawatts moving to L-2. A. All right.

Q. And 116 megawatts moving to L-1. A. All right.

Q. Now, under those conditions, Dr. Sorensen, would not

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some of the energy which is going to supply load L-1, which is taking, as we said 116 megawatts, wouldn't some of that energy have to come from source S-1? A. I have a little incongruity here. I have 161 going in and 166 going out. That won't work.

Q. I don't recall mentioning the figure 161. If I did, I didn't intend to.

Presiding Examiner: He is talking about totals.

Mr. Everett: I am sorry.

The Witness: You have 100 at S-2 and 61 at S-1 and 116 at L-2 and 50 at L-1. 116 plus 50 is 166. And on the other side you have 161.

By Mr. Everett:

Q. Well, let us assume, then, Doctor, to balance the system that we say that at S-2 we have moving 106, instead of—excuse me, 105, instead of 100. A. On S-2?

Q. Moving from S-2. 105 megawatts, instead of 100. A. All right.

Q. That is for the purpose of balancing the system.

Now, under those conditions, Dr. Sorensen, would not some of the energy moving from source S-1 be included in the delivery to load L-1? A. The 61 at S-1?

Q. Yes, sir.

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A. Would be included in the load L-1?

Q. Yes, sir. A. Yes.

Q. Well, how much of the energy being delivered to load L-1 would have to come from source S-1? A. How much of L-1 would have to come from S-1?

Q. Well, Dr. Sorensen, let us assume that S-2 is Etiwanda. A. All right.

Q. And that—— A. 105?

Q. Yes, sir. And that S-1 is Hayfield? A. S-1 is Hayfield. All right.

Q. And that L-2 is Chino. A. L-2 is Chino.

Q. Yes, sir. A. At 116.

Q. And that L-1 would be banks 1-A and 2-A at Highgrove. A. Well, now, neither one of the 105 or the 61 can supply all of 116.

Q. So, therefore, a part of the energy being delivered at load L-1 would have to be supplied by source S-1 or Hayfield, is that correct? A. That is correct.

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Q. Is that correct, Doctor? A. Yes. Because I have 161 supplied and 116 taken out at L-2. That leaves only 45 left to go to L-1 from the two supplies and since L-1 takes 50, it has to get some from——

Q. Well, Doctor, in this example that I have just stated, the load at L-1 is 116 megawatts? A. The 105 could supply all of L-1.

Q. Pardon me, sir? A. And half 55 left over. 55 added to the 61 from S-1 would give us our 116 on L-2. So L-1 could get its 50 without taking any part from S-1.

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Q. Dr. Sorensen, I don't mean to belabor this point, but I think perhaps you didn't understand me when I stated some of these values for some of these places.

At S-2, I suggested we assume a value of 105 megawatts. A. That is right.

Q. At S-2 105 megawatts? A. That is right.

Q. And at S-1, a value of 61 megawatts? A. That is right.

Q. And at L-2, 50 megawatts. A. L-2?

Q. Yes, sir. At L-2, 50 megawatts.

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A. I had them the other way. You mean I have them reversed here?

Mr. Bury: Dr. Sorensen, I am going to show you a diagram containing the values which have been shown to Mr. Goldberg and which, I believe, state the assumptions which he has made for the purpose of asking the question.

Mr. Goldberg: That Mr. Everett made.

Mr. Bury: Pardon me. That is correct. I have handed you a diagram containing the values which Mr. Everett has stated he wishes assumed for the purposes of this question.

The Witness: All right. Excuse me. I had them reversed on here.

By Mr. Everett:

Q. All right. Assuming we had these figures superimposed upon Exhibit No. 33 for identification, would it not be true, Doctor, that a part of the energy being used to supply the load at L-1 would come from source S-1? A. Yes, with these figures, 105, 61, 116, to be sure, because 105 won't supply 116.

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Q. Dr. Sorensen, do you have S-1 labelled as Hayfield—S-1 as Hayfield? A. On this diagram?

Q. Yes, sir. And S2 as Etiwanda? A. That is right.

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Q. And L-2 as Chino? A. That is right.

Q. And L-1 as the banks 1-A and 2-A at Highgrove? A. That is right.

Q. Doctor, do you have a copy of the Edison Company's Form No. 12 for the year 1958? A. I don't know.

Q. That is the power system statement.

Mr. Bury: I am sure he would not. I have one, however, would you like me to obtain it and show it to him?

Mr. Everett: I have one here, Mr. Bury. Don't bother.

Mr. Bury: What is the pending question?

Mr. Everett: Just a moment, please, Mr. Bury.

By Mr. Everett:

Q. Dr. Sorensen, I believe that Mr. Bury will hand you a copy of Edison Company's Form 12 for the year 1958, and I will ask you to refer to Schedule 18-B on page 31. A. All right.

Mr. Everett: Mr. Examiner, at this point the Staff requests that there be identified as an item by reference for incorporation into this record, page 31 of Schedule 18-B, appearing in FPC Form No. 12 of the 1958 Power System Statement, filed by Southern California Edison Company.

Presiding Examiner: It will be marked Item I for identification.

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(The document referred to was marked for identification as Item I by reference.)

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Mr. Bury: Mr. Everett, do you intend to indicate what specific lines or figures on that page you want entered? Or do you want the entire page?

There is a question pending.

Mr. Everett: I think you asked, Mr. Bury, if the Staff wanted to have just certain lines on that page.

Mr. Bury: I really just wanted to clarify for myself what has been identified. If the page has been identified as the item that is sufficient.

Mr. Everett: Yes, sir, that was the intention that page 31 of Schedule 18-B be the item to be incorporated by reference.

Mr. Bury: All right.

By Mr. Everett:

Q. Dr. Sorensen, referring to Item I by reference, for identification, do you find the line which shows the normal flow of power from Etiwanda to Highgrove, the first column, Doctor, you will notice, headed "Line Terminals," and then there is a subheading "Nominal Flow of Power." A. Oh, I see, the top here.

Q. And do you find the line, sir, where it reads from Etiwanda to Highgrove? A. Right.

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Q. And do you also find, sir, continuing on that line over to the column which is headed "August"—I believe that is column 7. A. All right.

Q. And what value appears there, Doctor, please? A. You mean, this figure 100?

Q. Yes, sir. A. Yes.

Q. And those readings, Doctor, are in what, what unit of measurement? A. I have no indication here. Perhaps megawatts. I don't know.

Is that here?

Oh, here is a little m.w. All right. I will get my trifocals down there.

Q. 100 megawatts? A. 100 megawatts, yes, sir. I haven't seen this sheet before.

Q. And then, Doctor, dropping down to the next line, which reads, "From Hayfield to Highgrove"—— A. Yes.

Q. And going again across that line until we reach column 7. A. Yes.

Q. Which is headed "August."

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A. Yes.

Q. Would you please read the value which appears there? A. 61.

Q. And that would be 61 megawatts? A. Right.

Q. Thank you.

And then, sir, going to the next line where the normal flow of power is from Highgrove to Chino, would you continue over again to column 7 headed "August" and state the reading which appears there? A. 50.

Q. And that would be 50 megawatts? A. Right.

Mr. Everett: Mr. Examiner, the Staff requests that there be identified as an item by reference for incorporation into this record Schedule 14 of the same Power System Statement which was referred to in Item I for identification.

Presiding Examiner: What is the page?

Mr. Everett: The page, sir, is 23.

Presiding Examiner: Page 23?

Mr. Everett: Yes, sir. Schedule 14 appearing on page 23.

Presiding Examiner: Is it 14?

Mr. Everett: Yes, sir, Schedule 14, page 23.

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Presiding Examiner: Does the letter "b" follow it?

Mr. Everett: No, sir, just Schedule 14, no letter following it.

Presiding Examiner: FPC Form 12?

Mr. Everett: Yes, sir.

Mr. Bury: For the year 1958.

Mr. Everett: Yes. Filed by Southern California Edison Company.

Presiding Examiner: It will be marked Item J for identification.

(The document referred to was marked for identification as Item J by reference.)

By Mr. Everett:

Q. Dr. Sorensen, referring to Item J for identification, do you find in that item, about in the second set of Tables, the first column or the column nearest the left side of the page being headed "Month" and being numbered "Column (7)"—would you please note that in that column there is listed the month of August? A. I see it.

Q. And reading across to the right on that line, Doctor, to the column No. (11), which is headed "Peak Load" and then under that the subheading "Date." A. Yes.

Q. Would you tell us, please, what is shown there

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as the date? A. 14th.

Q. And that would be August 14th? A. That is right.

Q. And in the next column, sir, they give the clock—hour of reading? A. That is right, nine o'clock.

Q. Nine o'clock.

And that would be 9:00 p.m., would it not, sir? A. That is what it says, yes.

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Q. Doctor, do you have before you a copy of Exhibit No. 3 that is the power flow data exhibit of the Commission staff? A. I don't know.

Yes.

Q. Doctor Sorensen, referring to Exhibit No. 3 and more specifically to page 11 of that exhibit, would you please state what is shown there as the total number of megawatts being taken by the Highgrove banks at 9:00 p.m., on August 14, 1958? A. 116, total of two 58's—that is, two times 58.

Q. The total being taken at the Highgrove banks is 116? A. Highgrove substation bank, total of 116, right.

Q. Well, then, Dr. Sorensen, these figures which I

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earlier asked you to superimpose upon Exhibit No. 33 for identification represent actual flows and loads as shown on the Edison Company records, do they not?

Mr. Bury: I will object to that question as assuming facts not in evidence. There has certainly been no showing that that is what Schedule 18-B of the Form 12 report shows at all.

Mr. Goldberg: May I have the question to which the objection has been made?

(The question, as recorded, was read by the reporter.)

Mr. Bury: There is no evidence that they represent actual flows or loads, certainly not the figures in the Form 12, Schedule 18-B.

I direct your attention to that item above the column of figures, in parenthesis the word "estimated", that coupled with those, purport to be megawatts readings, there is ample evidence in this record that there are no meters on those lines.

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Furthermore, the witness has already indicated that he has never before seen this material in Form 12 which you presented to him.

Mr. Everett: Well, I will re-phrase my question.

By Mr. Everett:

Q. These values, Dr. Sorensen, which I asked you to place upon Exhibit No. 33 for identification correspond,

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do they not, with estimated values set forth in the records filed by Edison Company with the Federal Power Commission? A. These figures we have here can be arranged so they show the figures we have on 33, if you use them that way, yes. I am not prepared to say what they mean.

Q. No, sir, these——

Mr. Bury: The numbers are the same, I will stipulate to that.

Mrs. Pajalich: One number isn't the same, Mr. Bury.

Mr. Bury: That is right. I am sorry. One number, with the exception of the figure you placed on the exhibit at Etiwanda which was changed by five megawatts.

Mr. Everett: The only variation would be whereas you report 100 megawatts, Mr. Bury, estimated as flowing from Etiwanda to Highgrove, for the purpose of this example I think I asked Dr. Sorensen to assume that there was 105?

Mr. Bury: That is correct.

Mr. Everett: And as a result of doing that the system would balance? In other words, your sources would total 166 and your loads would——

By Mr. Everett:

Q. Now, Dr. Sorensen, would you assume that on Exhibit No. 33 for identification we had a flow of 120 mega-

watts from S-1 or as I believe Mr. Bury said this morning, we would call that Etiwanda.

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I am sorry. S-2 I should have said—flow of 120 megawatts, Doctor. A. You are now making it 120 instead of 61.

Q. No, I will begin that question again, Doctor.

Let us assume that we place upon Exhibit No. 33 for identification a flow of 120 megawatts from S-2, and let us say that that represents Etiwanda.

Mr. Bury: What was that value?

Mr. Everett: 120 megawatts.

By Mr. Everett:

Q. And from source S-1 at Hayfield, let us assume that there were 72 megawatts flowing, and assume further that load L-2 or Chino was taking 60 megawatts. A. 60?

Q. Yes, sir.

And that load L-1 or banks 1-A and 2-A were taking 132 megawatts.

Under these assumed conditions which I have just stated, Dr. Sorensen, would some of the energy being used to serve the load at L-1 or banks 1-A and 2-A come from source S-1 or Hayfield? A. What is your question?

Q. My question was, under these latest figures that I have asked you to place upon Exhibit No. 33 for identification, would some of the energy which is being used to supply the

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load at L-1 or banks 1-A and 2-A come from source S-1 or Hayfield? A. Yes.

Q. Now, Doctor, would you please refer again to Item I for identification. That was the Edison Company's 1958 power system statement, Schedule 18-B, page 31.

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Do you find in Column 1 the word "Etiwanda" and in Column 2 the word "Highgrove"? A. All right.

Q. Would you come across that line, Doctor, to Column 8 which is headed "October"? A. Yes.

Q. And would you please state what value is shown, Doctor? A. 120.

Q. And that would be 120 megawatts. A. Yes.

Q. Now, dropping down to the next line, Hayfield to Highgrove, and again going across the line to Column 8, would you please state what value is shown there? A. 72.

Q. That would be 72 megawatts. A. Right.

Q. Then, going down the next line, Highgrove to Chino, and going across until we come to Column 8, headed "October,"

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would you state what value appears there, please? A. Column 8?

Q. Yes, sir. A. 50.

Q. 50.

Now, Dr. Sorensen, would you please turn to Item J by reference which was, as you will recall, Schedule 14, page 23 of the Edison Company's 1958 power system statement. A. Yes.

Q. Doctor, in that Item J by reference, for identification, do you see the second set of tables, the first column is headed "Month" and then under that the figure (7)? A. Yes.

Q. Would you please follow down that column until you reach the month of October? A. I have it.

Q. And then, sir, would you please come across on that line until you come to the column No. 11, which is marked "date" under the words "peak load" and state the date given there, please? A. 16th.

Q. 16th. Thank you.

That would be, of course, October 16th, wouldn't it, sir? A. I presume so, yes.

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Q. And in the next column, when they give the clock hour reading. A. 6:00 o'clock p.m.

Q. That is six p.m.? A. Right.

Q. Thank you, sir.

Doctor, would you take a look at Exhibit No. 3—that is the power flow data exhibit—and turn, please, to page 6.

On that page 6 of Exhibit 3, Doctor—— A. I have it.

Q. Do you find the date of October 16th, 1958? A. Right.

Q. And the time of six p.m.? A. Right.

Q. And would you continue across on that line, sir, please, and give the reading for the total load at the Highgrove substation banks? A. 132.

Q. 132.

And that would be 132 megawatts, would it not? A. Right.

Q. Thank you.

Doctor, this last group of figures which I asked you to place upon Exhibit No. 33 for identification, correspond,

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do they not, with the estimated values contained in the Edison Company reports with the exception of the figure of 60 megawatts for load L-2? A. You are accepting 60? I didn't see the figure 60.

Q. Well, I believe the figures then which I gave you do correspond with the estimated values as reported by the Edison Company in its reports. A. 60, I don't remember seeing.

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Q. Forgetting a moment about the 60, the value of 50 megawatts at L-2, plus these values at S-2, S-1 and L-1 do correspond with estimated values contained in reports of the Edison Company filed with the Federal Power Commission. A. We have 192 on both sides total, both the left and right, on these figures.

Q. Well, you will have that if you add to the value shown for L-2, 10, is that correct? A. Well, the value gave me originally from L-2 was 60 but I didn't see any 60 in here.

Q. Except for that figure at L-2, these values do correspond with the estimated values reported by the Edison Company in its reports filed with the Federal Power Commission? A. Yes, you can build 132 and 72 and 120 out of what we see in here.

Mr. Bury: "In here" being a reference to Edison's Form 12 for 1958?

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Presiding Examiner: Mr. Everett, what the witness says to you is that he finds all of the numbers which you gave him with the exception of the 60 opposite L-2.

Mr. Everett: Yes.

Presiding Examiner: In the Items I and J to which you have referred him.

Isn't that what he said, Mr. Bury?

Mr. Bury: I think that is right. I think it should be pointed out, however, that only two of the figures come from Items I and J. The third figure comes from Exhibit 3, but those three figures were identified by the witness.

Presiding Examiner: But 60 he didn't find in that.

Mr. Bury: Yes.

Mr. Goldberg: And the record shows what does appear in lieu of the 60.

By Mr. Everett:

Q. Dr. Sorensen, again referring to Exhibit No. 33 for identification, let's assume that at S-2, which I believe Mr. Bury said this morning we would call "Etiwanda," let's assume that there is a value of 52 megawatts moving from S-2. A. 52?

Q. Yes, sir.

And that a value of 66 megawatts moving from source S-1. A. 60?

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Q. 66, sir, moving from S-1 or Hayfield, and let's assume, also, that at L-2, at load L-2 or Chino, there is being delivered 9 megawatts.

Under the assumption which I have just stated, Dr. Sorensen, how much energy would be flowing to load L-1 or banks 1 and 2? A. 109, the sum of 52 and 66, minus 9.

Q. Now under these conditions, Dr. Sorensen, using these figures which I have just stated, and also the figure which you have just stated of 109 at load L-1, would there be any energy flowing from source S-1 to load L-1, in other words, from Hayfield to banks 1-A and 2-A? A. Yes, these figures would show that load goes from S-1 to L-1.

Mr. Everett: Mr. Examiner, the staff asks that there be identified as an item by reference for incorporation into this record, Schedule 18-B, page 31 of FPC Form No. 12, Southern California Edison Company power system statement for 1957.

Presiding Examiner: That is page 31?

Mr. Everett: Yes, sir.

Presiding Examiner: Schedule 18-B?

Mr. Everett: Yes, sir.

Presiding Examiner: It will be marked Item K for identification.

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(The item referred to was marked for identification as Item K by reference.)

By Mr. Everett:

Q. Referring, Doctor, to Item K by reference for identification, do you find in Columns 1 and 2 under normal flow of power the words "from Etiwanda to Highgrove"? A. Correct.

Q. And would you please come over on that same line to Column No. 6 entitled "April" and state what value appears there? A. 52.

Q. And that would be 52 megawatts? A. Right.

Q. Then, coming to the next line which reads from "Hayfield to Highgrove". A. Right.

Q. Would you again come across, please, to Column 6 which is headed "April" and state the value which appears there? A. 66.

Q. That is 66 megawatts. A. Correct.

Q. And, then, going to the next line, reading from "Highgrove to Chino," and going across that same line to Column 6, entitled "April", would you please tell us the

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value given there? A. 9.

Q. And that would be 9 megawatts? A. Right.

Mr. Everett: Mr. Examiner, the staff requests that there be identified as an item by reference for incorporation into this record Schedule 14, which appears on page 23 of the previously mentioned FPC Form No. 12 of Southern California Edison Company for the year 1957.

Presiding Examiner: It will be marked Item L by reference for identification.

(The document referred to was marked for identification as Item L by reference.)

By Mr. Everett:

Q. Dr. Sorensen, do you have Item L by reference for identification before you, that is, Schedule 14? A. What is Item L?

Q. That is Schedule 14 in Edison Company's 1957 power statement. A. Is this it?

Mr. Bury: Yes, that is the book he is referring to. That is the page.

The Witness: Oh, I see. All right.

By Mr. Everett:

Q. Do you have it now, sir?

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A. I believe so.

Q. In the second table in Schedule 14, do you find a column entitled "month" and then under that the figure (7)? A. Yes.

Q. And would you please, sir, go down that column until you reach the word "April"? A. All right.

Q. And then would you come across, please, to the column No. (11) which is headed "date" and which comes under the general heading of peak load? A. All right.

Q. And would you please state the date that appears there? A. 11th.

Q. So that would be April 11th? A. Right.

Q. And that is 1957, of course. A. Right.

Q. And then, sir, continuing on that same line, the next column, column No. (12), entitled "clock hour ending" would you give the time, please, that is given there? A. 7:00 o'clock.

Q. That is 7 p.m.? A. Right.

Mr. Bury: Mr. Everett, am I correct that you do not have an entry for that time and date in Exhibit 3 as in the

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two prior examples you put to the witness?

Mr. Everett: Would you repeat your question, Mr. Bury, please?

Mr. Bury: I just wanted to know if for that date and time the witness just referred to there was an entry in Exhibit 3 as had been the case with the two prior examples you had put in?

Mr. Everett: No, sir. There is not.

By Mr. Everett:

Q. Dr. Sorensen, except for the value of 109 megawatts for banks 1-A and 2-A, which value you computed for us, do the other values which I asked you to place upon Exhibit No. 33 for identification, that is, the values for S-1, S-2, and L-2, do they correspond with the estimated values appearing in the reports filed by the Edison Company with the Federal Power Commission? A. You will find those figures in there, yes.

Mr. Everett: We have no further questions at this time to ask of Dr. Sorensen, Mr. Examiner.

Presiding Examiner: We will take the afternoon recess.

(At this point, 3:10 p.m., a recess was taken until 3:20 p.m.)

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Presiding Examiner: Come to order.

Mr. Goldberg, do you have some questions?

Mr. Goldberg: Yes, I have just a few questions on recross.

Recross-Examination

By Mr. Goldberg:

Q. Dr. Sorensen, may I direct your attention again to Exhibit No. 33. Do you have that before you? S-1

and S-2 are generating sources, as I understand it, right? A. That is the assumption.

Q. And L-1 and L-2 are loads? A. Right.

Q. Now, was S-1 installed for the purpose of serving L-2, only? A. I had not thought about why it was installed.

Q. Judging by the connection there, it would appear to me that it could serve L-1 or L-2, or both? A. If you had source enough, yes.

Q. And the same is true of S-2. It is installed to meet whatever loads there are on this system that is depicted on Exhibit 33? A. Limited to this system, yes.

Q. Yes. And this is the system that you said could be compared to Etiwanda, Hayfield, Chino, and Transformer Banks 1-A and 2-A of the Edison Company, right?

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A. It is a diagram similar to one that you could draw for that much of the Edison system, yes.

Q. Yes. Now, I think we have agreed that based upon what you have depicted here, S-1 can serve L-1 and L-2, right? A. Not completely, but partially.

Q. Depending upon the values? A. They can serve them, yes.

Q. And S-2 can serve both L-1 and L-2? A. Yes.

Q. And S-1 and S-2 can serve L-1 and L-2? A. Correct.

Q. And S-1 and S-2 can serve L-2? A. Yes, either one of them can serve L-2.

Q. I meant both—S-1 and S-2, in combination, can serve L-2? A. Well, they can serve the whole business.

Q. And they can serve L-2, right? A. Right.

Q. And S-1 and S-2 in combination can serve L-1? A. Right.

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Q. Now, in installing a generating source, the intent is to serve whatever loads can be served from that generating source, isn't it? A. Yes.

Q. Now, in view of what we have just gone over, can't

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we agree that in addition to the assumptions you made in presenting the Exhibits 31, 32 and 33, that the loads, both loads depicted on the exhibits, can be supplied—let me start over. That it can be assumed that both loads are served from both sources? A. Well, they are at present. That is, L-1 and L-2 were served long before Hoover Dam was built.

Q. Yes. But my point is this. You made certain assumptions in presenting it? A. In these diagrams, yes.

Q. And I have just gone over with you the possibilities of supply. And I say to you, in view of your testimony, and what we have just gone over, isn't it also reasonable to assume that both loads are served from both sources? A. Both loads are served in part at times no doubt from both sources.

Q. From both sources? A. Right.

Q. Yes. A. Both or either one.

Q. Now, couldn't it be just as reasonably assumed—— A. Now, wait a minute. You are getting me into difficulty. If the figures show it properly, both loads could be served from both sources. It is not necessarily so.

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Q. I don't want to get into the question of what figures are available at the moment. Apart from the values that are flowing on the line, and that the generators are supplying, with this type of a system, as you have shown on Exhibits 31, 32 and 33—it is just as reasonable to assume, in addition to the assumptions you have made—let me

finish. A. No, I wouldn't assume at all that those sources were put in there so Colton could be served.

Q. I didn't hear that. Will you read that please?

(The answer, as recorded, was read by the reporter.)

Mr. Goldberg: I wasn't getting into that at all yet, nor do you have to be concerned with that. I want to be sure that you are not giving me answers that are predicated on the proposition that you don't want to agree with me that these sources serve Colton. Is that what I am to understand?

The Witness: Well, I think that is what you are trying to get me to say.

By Mr. Goldberg:

Q. And you are not going to agree with me, as long as you think agreement with me means—— A. I am not going to agree with you that we can prove those sources do serve Colton, no.

Q. Dr. Sorensen, I want to understand the basis on which

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you are answering my questions. Do I understand from what you said to me that if you suspect that the answer to the question requires agreement, that Hayfield energy gets to the City of Colton, you will simply not agree with me? A. I will agree that these figures which we have here indicate that would be so. I have no evidence that these figures are an actual condition which exists.

Q. All right.

Now that we understand each other, let us get back to my question.

My question is this: Isn't it reasonable to assume, considering the type of connections you have here, on Exhibit No. 33, that the loads are served from both supply

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sources? A. If you can check those figures with a calculating board, I will agree.

Q. I don't want to get into the values that are shown. I want to know whether you agree with me or don't agree with me. A. I can't agree without figures.

Q. And my assumption is not a reasonable assumption—that on what you depicted, it is reasonable to assume that both loads receive their supply in part from each source? A. Accepting these figures, yes.

Q. You can't answer me without figures?

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A. No, I can't answer you without figures.

Q. You can't answer me whether as a matter of a reasonable assumption in solving a jurisdictional problem such as the Federal Power Commission must solve in this case, it is reasonable under these circumstances, depicted on Exhibit 33—— A. Without figures technically it is not.

Q. To assume that both loads receive their supply in part from each generating source? A. That is not a technically sound assumption.

Q. Now, you say it is not a technically sound assumption. My question is isn't it as reasonable as the assumptions you made? A. It is a possible assumption, yes. That is, as I said before, it is one of these things you can't say yes or no.

Q. Now, just one more thing.

When Hayfield energy gets on the transformer banks, A and B, then it follows, does it not, that Hayfield energy goes on into the City of Colton? A. If that is the only energy that goes to the transformer bank, yes.

Q. When the energy that gets on to those transformer banks—must go on into the City of Colton, at least in part, isn't that so?

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A. Well, I am not sure whether Colton has any other line except from those transformers.

Q. Let me show you the Colton switching center diagram, which has been identified as Exhibit 28 by the California Commission's engineer, Mr. Patterson. And I direct your attention to the letter "A". Now you recognize the lines designated Globe Mills and Derby, as the circuits that serve the City of Colton? A. Yes.

Q. And I understand that you have at least a general familiarity with that area, isn't that so? A. A general familiarity.

Q. And doesn't your general familiarity with that area tell you that when Hayfield energy gets on transformer banks A and B, that the energy must get into the City of Colton?

Mrs. Pajalich: Mr. Examiner, I am going to object to that question as not warranted by the evidence. There is no evidence to support the question when it gets on the banks. It should be if it gets on the banks.

Mr. Goldberg: I will stand on when. I think the record already shows it when.

Presiding Examiner: The objection is overruled.

Mrs. Pajalich: Very well.

By Mr. Goldberg:

Q. Isn't the answer yes to my question, based upon the

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connections that you see before you. You notice the open switches at 246, 371 are open? A. If everything is open except the connection to the transformers, at that time, yes.

Q. Thank you.

Mr. Bury: May I have that answer read back, please?

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Presiding Examiner: Read it, Mr. Reporter.

(The answer, as recorded, was read by the reporter.)

Mr. Goldberg: Thank you very much.

Those are all the questions I have.

Presiding Examiner: Does the California Commission have any questions?

By Mrs. Pajalich:

Q. Dr. Sorensen, I will direct your attention to Exhibit 27. Could not some of the energy which comes in on the 66 KV bus to the Highgrove substation, go out to the Cardiff substation? A. Yes.

Q. Could it not go to the Chino substation? A. Yes.

Q. Could it not go to the Colton Cement——

Mr. Goldberg: Just a minute. Are we getting answers?

Mrs. Pajalich: Yes, the answer is yes to each of these questions.

Mr. Goldberg: Let us just take our time a moment. I

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can't hear that. Did the witness say that energy coming off the Highgrove substation would flow to the Chino substation?

Presiding Examiner: He said it could.

Mr. Goldberg: On the basis of the diagram that is before him?

Mrs. Pajalich: Yes, sir; he said it could.

Mr. Goldberg: All right.

Mr. Everett: Which exhibit is this now?

Mrs. Pajalich: Exhibit 27, Mr. Everett.

By Mrs. Pajalich:

Q. I had started to ask the witness, Mr. Examiner, whether the energy off the Highgrove substation could also flow to the Colton Cement Company. I don't believe the witness has had an opportunity to answer that question. Would you answer it, please, Doctor? A. Yes.

Mrs. Pajalich: Thank you.

I have nothing further, Mr. Examiner.

Presiding Examiner: Mr. Bury?

Mr. Bury: I understand we will be permitted some questions on the basis of the examples put to Dr. Sorensen by Mr. Everett?

Presiding Examiner: That is right.

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Redirect Examination

By Mr. Bury:

Q. As I recall, Dr. Sorensen, Mr. Everett put to you three examples, or suggested that three different sets of values be placed upon your diagram, and he asked you to draw certain conclusions from the diagram, and the values that he postulated.

In giving those answers, did you assume that the values he gave you all occurred coincidentally or simultaneously? A. Yes.

Q. And is such an assumption of simultaneous values essential to the analysis? A. If they were not, they would be meaningless.

Q. Dr. Sorensen, are you familiar with the manner in which the estimates of line loadings appearing in Schedule 18 of the FPC Form 12 Reports are prepared? A. I presume they are prepared from reports sent in by substation operators. Since there are no meters, as I understand it—those are estimates.

Q. Particularly the reference that was made to values for certain lines, such as Etiwanda to Highgrove, Highgrove to Chino, do you know at which end of that line that value is supposed to represent loading? A. I do not.

Q. Doctor, do you have before you diagrams noting

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values that Mr. Everett asked you to assume in the examples? A. The ones we used here you mean?

Q. Yes. A. Yes.

Q. Would you turn first to the first example he asked you about. If you remember correctly, he asked you to assume a value for S-1 of 61 megawatts. A. Right.

Q. And then directed your attention to a value of 61 megawatts appearing in the Form 12 Report. Is that correct? A. Right.

Q. Do you have before you a copy of Exhibit 3—the power flow data tabulations prepared by the Staff? A. That is this one? No?

Q. Do you recall in connection with that example he directed your attention to the date and time of August 14, 1958, at nine p.m.? A. Yes.

Q. I show you Exhibit 3, page 11, and on that page a line representing August 14 at 9:00 p.m. That is August 14, 1958. You will notice that the figure appearing farthest to the right appears a value of 116, which he had you insert in that first example. You recognize that figure? A. Yes. This isn't the same book.

Q. It is another copy of the same book. But you see

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the value of 116, which he asked you to insert in that? A. That is right.

Q. And you did so in that example? A. I did so.

Q. You also recall he had you insert by circle S-1, representing Hayfield, a value of 61, is that correct? A. Right.

Q. And on this same line of page 11 of Exhibit 3, do you notice in the first column of values, under the column Hayfield to Highgrove, hour, for 9:00 p.m., of that date, what value appears? A. 55.

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Q. Now, directing your attention to the second example, Dr. Sorensen, that Mr. Everett had you use, and I believe that in connection with this example he directed your attention to the date of October 16, 1958, at 6:00 p.m.? A. That sounds familiar.

Q. Turn to page 6 of Exhibit 3. Towards the bottom of the page you will find a line of figures for the date October 16 at 6:00 p.m. You see that column, or that line rather? A. Correct.

Q. And the figure appearing farthest to the right in that column is the value of 132, which he had you insert in that example next to load L-1?

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A. Correct.

Q. And you did insert and use that value in that example? A. I did.

Q. And in that example, I believe, by reference to the Form 12 Report, he had you insert next to the circle S-1 representing Hayfield the value of 72 on that example, did he not? A. He did.

Q. Turning back to page 6 of Exhibit 3, what value is found there for the Hayfield to Highgrove delivery at that hour and date? A. It looks like 22.

Q. Thank you.

If you were to use the values appearing in Exhibit 3 rather than the values that Mr. Everett asked you to use from the Form 12 Report, would they affect your conclusions? A. You mean if I used 22 for S-1 instead of 72?

Q. Yes. A. Well, then—well, if we still have 60 and 132, we don't check. We are trying to make 142 satisfy 192 in that case, and that won't work.

Q. Well, under Kirchoff's Law, there would have to be also some variation in one of the other figures, would there not? A. Yes.

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Doctor, one other question. In connection with all the examples you have used here today, including those which I proposed and those which Mr. Everett proposed in the simplified network which we have assumed, you have assumed—you have assumed zero losses on all circuits. Is the answer yes? A. What is that? The answer is yes.

Mr. Bury: That is all.

Presiding Examiner: Dr. Sorensen, thank you, sir. You may be excused.

(Witness excused.)

Presiding Examiner: Are you ready, Mr. Everett?

Mr. Everett: Yes, Mr. Examiner.

Whereupon,

EARL SAMPLE

was recalled as a witness and, having been previously duly sworn, was examined and testified as follows:

Cross-Examination

By Mr. Everett:

Q. Mr. Sample, as liaison for the Edison Company with the Commission's staff during its field examination, did you in general become acquainted with the study being made by the Commission's staff and with its purpose? A. I was acquainted with the questions that they asked me.

Q. Well, did you know that the purpose of the study

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was to determine whether out of state electric power was included in the deliveries by Edison Company to the City of Colton? A. I was informed by them that that was the reason they were there.

Q. Thank you. Subsequent to the field examination by the Commission's staff, Mr. Sample, I believe that you

made a series of studies on the AC network calculator consisting of seven sheets which were admitted in evidence as Exhibit 11. Is that correct? A. That is correct.

Q. Would you please state what sources of electric power shown on these sheets in Exhibit 11 are located in California? A. Referring to Exhibit 11?

Q. Yes, sir. A. And to any special page in Exhibit 11?

Q. No, sir, any sheet. A. The sources of generation shown on this sheet will show—is that what you wanted—the source of generation?

Q. I believe I asked you, sir, to state the sources of electric power shown on these sheets in Exhibit 11 which are located in California—that is the sources which are located within the State of California. A. The Etiwanda, the lines leading to or from Eti-

wanda, designated Barre, the lines leading to Chino substation from Center and our other generating stations beyond Center, from the line leading from Barre to Chino, from the other parts of our 220 KV network. I think those are the possibilities of source to the Highgrove substation shown as encircled from Etiwanda's—from the 220 KV system.

Q. Well, in addition to Etiwanda being a source of electric power located in California, as shown on these sheets, is there any other source of electric power located in California shown on these sheets? A. Shown by the designation of lines, it is indicated that these lines between circles are 220 KV lines, and leading into the 220 KV switch rack at the Etiwanda and at Chino, are lines with arrows on them, indicating that they are connected to the 220 KV grid, because these are lines on here which have been designated as 220 KV lines.

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Q. Are these all sources which you have mentioned? A. They are part of the network of 220 KV, and to that extent, they are connected to all other sources of generation.

Q. Well, my question, I believe, was simply to state the sources, not the connections or interconnections—just the sources of electric power shown on these sheets in Exhibit 11, and located within the State of California. A. If you want a one generating plant that is shown

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on here, that would be Etiwanda. But that does not indicate all of the sources that are shown on here, nor are they part of the study.

Q. Well, would you name the sources? A. I think I already have, as indicating the 220 KV lines coming into these 220 KV switch racks, which are connected to our whole 220 KV grid, which would be connected to Big Creek, to Redondo, Etiwanda, to our other generating plants, steam or hydro.

Q. I think you mentioned Barre, did you not? A. Barre is a 220 KV switching, so that we have lines coming into Barre tied to our grid as shown by our exhibits.

Q. Confining yourselves to your Exhibit 11, it would seem that Barre was a load rather than a source? A. At this one instance, as shown here.

Q. Well, my question was confined to what was shown in your Exhibit 11. Now, you mentioned I think Center also, did you? A. Center is shown on here in this case as a line.

Q. But that also is a load rather than a source, is it not? A. At this instance in time that I am looking at on Sheet 1, which is for July 1, 1954, 2:00 p.m.

Q. That is what my question is confined to, is your

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Exhibit 11, and if you wish to take a specific sheet, let us take Sheet No. 1. But on Sheet No. 1 of your Exhibit 11, neither Barre nor Center could be classified as sources of electric power, could they? A. For this instance, they are not.

Q. But Etiwanda would be a source? A. Yes, it would.

Q. Now, are there any other sources of electric power shown on Sheet 1 of your Exhibit 11, sources in the same sense that Etiwanda is? A. Do you mean those that are outside of the state——

Q. Located in California. A. No, there are no others shown at this time.

Q. Well, Mr. Sample, looking at Sheet 1 of your Exhibit 11, in the far right-hand corner, how about Parker. Is that not located within the State of California? A. Parker is located within the State of California.

Q. The power plant? A. The power plant, generation.

Q. Are there any other sources of electric power shown on Sheet 1 of your Exhibit located in California, other than Etiwanda and Parker? A. No, there are not.

Q. Thank you.

Well, then, the generators—excuse me, still referring

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to Sheet 1 of your Exhibit 11, the generators at Hoover Dam and at Davis Dam are located outside the State of California? A. That is right.

Q. And all electric power received from Hoover Dam and Davis Dam would be out of state power, then, insofar as Edison Company is concerned? A. That would be my assumption—that they are located out of the state.

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Q. Well, then, with the exception of this electric power which might at times be generated at Parker Dam power plant, all the power which is received at Highgrove from Hayfield would be out of state power? A. For the 220 KV line going from Hayfield to Highgrove, the only sources of power are Parker, Davis and Hoover.

Q. Well, excepting the electric power that might be generated at Parker, all the other power that is received at Highgrove from Hayfield would be out of state, would it not? A. That is right.

Q. Well, then, Mr. Sample, for the purpose of determining the presence or existence of out of state energy reaching the Highgrove 220 KV substation, shown on your Sheet 1 of Exhibit 11, is it not true that only the kilowatt hour reading on the Highgrove-Hayfield 220 KV line at Highgrove,

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and the amount of electric power contributed to MWD by Parker Dam are required? A. Will you read that question again?

Q. Yes, I will. Isn't it true that for the purpose of determining the existence of out of state energy reaching the Highgrove 220 KV substation bus, that only the kilowatt hour reading on the Highgrove-Hayfield 220 KV line at Highgrove; and the amount of electric power contributed to MWD by Parker Dam are required? A. To show what is in the megawatt reading of power delivered to the 220 KV bus, and not to the transformer banks at Highgrove, it has to come from Parker, Davis, or Hoover.

Q. Well, then, all that you would need, then, to determine the amount of interstate—existence of interstate energy—out of state energy, excuse me, reaching the Highgrove 220 KV substation bus would be the meter

reading on the Highgrove-Hayfield 220 KV line at Highgrove, and the amount of electric power contributed to MWD by Parker Dam, isn't that right? A. You wouldn't know where it came from, from either Davis or Hoover. But you could trace it to the 220 KV bus from out of state for Hoover Dam or Davis.

Q. Well, just for——

Mr. Goldberg: Let us have the answer read, please.

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(The question, as recorded, was read by the reporter.)

By Mr. Everett:

Q. Well, in this question I was not asking you to state out of state energy sources. I am simply asking for the purpose of determining the existence of out of state energy reaching the Highgrove 220 KV substation bus, all that would be required, would it not, would be the kilowatt hour reading on the Highgrove-Hayfield 220 KV line at Highgrove, and the amount of electric power contributed by MWD—excuse me—contributed to MWD by Parker Dam? A. To be sure that I understood your complex question, I put it in words that I would know what I was saying, and undoubtedly what my answer was, was not sufficient. So maybe I didn't understand completely your whole question.

Q. Well, do you understand it now? A. I am not sure that I do.

Q. Well, I will repeat it very slowly.

Is it not true that for the purpose of determining the existence of out of state energy reaching the Highgrove 220 KV substation bus, that only the kilowatt hour reading on the Highgrove-Hayfield 220 KV line at Highgrove and the amount of electric power contributed to MWD by Parker Dam are required? A. Those are the important ones. I don't know if there

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are any others that I should give consideration to.

Mr. Bury: Mr. Everett, a great part of the problem is that in part of the question you are talking about power, and the other part of the question you are talking about kilowatt hours, which are energy, and not power.

By Mr. Everett:

Q. Well, Mr. Sample, confining ourselves, then, to kilowatt hour readings, if you have the kilowatt hour reading at Highgrove, and the kilowatt hour reading at Parker, do you need any other reading to determine—— A. That wouldn't give me anything.

Q. —the energy reading—— A. Kilowatt hours would indicate the quantities of energy that are used at those locations. Kilowatt hours would not help me to determine the power flow, which is kilowatts.

Q. I believe you stated, Mr. Sample, that with the exception of the electric power that might be generated at Parker Dam, all the power received at Highgrove from Hayfield would be out of state power, is that correct? A. That is what I stated.

Q. Well, then, if you subtract from the power received at Highgrove from Hayfield the amount of power that comes from Parker Dam, that would be all you would need, would it not; to determine the existence of out of state energy reaching the Highgrove 220 KV substation.

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A. The existence of out of state energy reaching? In other words, the power that is coming in over a period of time?

Q. Yes—coming into the Highgrove 220 KV substation. A. Yes, you could find what power is being delivered.

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Q. Thank you. Mr. Sample, the amount of electric power contributed by Parker Dam is always zero when the power received from Davis Dam is equal to or greater than the power being delivered to MWD at Gene, from Parker Dam substation, is it not? A. Would you read that question again, please?

(The question, as recorded, was read by the reporter.)

The Witness: When the amount of power being delivered from Davis to the 220 KV switch rack is greater at Parker than the generation at Parker, then the amount going to Gene would be coming from Davis.

By Mr. Everett:

Q. Mr. Sample, when the amount of energy coming from Davis is greater than one-half of the generation at Parker Dam, would not all of the energy which is being delivered to MWD at Gene be from Davis? A. When the energy being delivered from Davis is greater than one-half of the energy being generated at Parker?

Q. Yes.

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A. I don't see that that has any basis.

Q. Mr. Sample, from your studies of the MWD system you are aware, are you not, that MWD is entitled to approximately one-half of the generation of the Parker Dam power plant, and you were present when Mr. Montgomery so testified, were you not? A. I was present when he testified that in the contract they are, I think, to have one-half the generation capacity of Parker.

Q. Well, then, Mr. Sample, if the energy flowing from Davis to Parker Dam—strike that. If the energy flowing from Davis to Gene is greater than one-half the generation of the Parker Dam power plant, then all the electric power going to Gene would be from Davis, would it not? A. Not from an electrical standpoint.

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Mr. Goldberg: I didn't hear that.

The Witness: Not from an electrical standpoint.

Mr. Goldberg: Thank you.

By Mr. Everett:

Q. Referring to Sheet 1 of your Exhibit 11, I believe you have 188 megawatts, or 184 megawatts coming down from Davis, is that correct? From Sheet 1? A. Those are values that are shown in Exhibit 3. And that is the value that we have there, showing on the 220 KV line coming from Davis to Parker, we have 184 megawatts.

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Q. Yes. Now, what was going to Parker at that time? A. According to the study on the board, we are delivering—there was delivered 134 megawatts to the 220 to 161 KV bank.

Q. And how much was going to Gene at that time? A. According to this instance here, 50 megawatts.

Q. Well, how much of that 50 megawatts going to Gene was from Davis? A. I don't know, because there is an interconnection with Hoover up above, where it shows 135 coming from Hoover down to Davis.

Q. Well, how much of the 50 going to Gene came from Hoover and Davis? A. I would say that 50 megawatts was coming from Hoover and/or Davis.

Q. In other words, all the energy going to Gene? A. In this instance.

Q. At that time, came from Davis or Davis and Hoover, and none of it came from Parker? A. In this instance, I would assume that none came from Parker.

Q. This would be true in all instances similar to what you have here on Sheet 1? A. If all the conditions were the same as shown on Sheet

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1, yes.

Mr. Bury: Excuse me, may I have the last question and answer re-read?

Presiding Examiner: Yes. You may.

(The question and answer, as recorded were read by the reporter.)

By Mr. Everett:

Q. Well, then, Mr. Sample, the only readings that we need to determine the out of state power reaching the Highgrove substation from Hayfield are the readings of power received from Davis Dam at Parker Dam substation, and the amount of power delivered to MWD by USBR near Parker Dam substation, and the kilowatt hour reading at Highgrove substation, is that correct? A. No. You would have to include also State's Hoover, MWD Hoover.

Q. You said you would need also what? A. The Hoover generation.

Q. Well, could you be more specific. You have State's Hoover here and SCE Hoover, and MWD Hoover. A. I indicated State's Hoover and MWD Hoover.

Q. Why do you need that if you have a metering at Highgrove? A. Maybe I misunderstood your first question—if you would re-phrase that one.

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Mr. Everett: Would you read the question back?

(The question, as recorded, was read by the reporter.)

The Witness: If you have the readings of the megawatts at Parker 220 KV, the readings of megawatts—that was for the line from Davis to Parker. If you have the reading of the megawatts at State's Hoover, and of the line going from Hoover to Davis, if you have the reading of the line coming from MWD Hoover, N5 and N6 on

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the megawatts, and the generation at Parker on the 161 KV. side, and the loads of the pumps for the MWD, you would be able to determine the megawatts coming into Highgrove.

By Mr. Everett:

Q. Well, referring to Sheet 1 of your Exhibit 11, both State's Hoover and Davis and MWD Hoover are located, all three of those—State's Hoover, Davis and MWD Hoover, are sources located outside the State of California, are they not? A. They are.

Q. Well, in determining the out of state power reaching Highgrove substation, why would it be necessary to designate these sources here—MWD Hoover, State's Hoover? A. You could say the megawatt reading at Highgrove, if there were no megawatts being delivered from Parker into this 220 KV system—you could say that the megawatt reading at Highgrove was out of state energy.

Mrs. Pajalich: Mr. Examiner, may I have the last question—

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read—not the answer, just the question?

Mr. Goldberg: Let us have them both.

Mrs. Pajalich: All right, let us have them both.

Presiding Examiner: Would you read them, Mr. Reporter?

(The record was read by the reporter.)

By Mr. Everett:

Q. Well, we just saw, did we not, Mr. Sample, that with the energy coming from Davis, it exceeds that going to Gene, then we know how much is coming from Davis—how much of that energy goes to Gene is coming from Davis? A. Yes. We have that.

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Q. Well, then, isn't it true that the only readings you need to determine the out of state power reaching Highgrove substation from Hayfield are the readings received from Davis at Parker Dam substation, and the amount of power delivered to MWD by USBR near Parker Dam substation, and the kilowatt hour reading at Highgrove substation? A. When you say near Parker Dam, you are referring to the Camino tap?

Q. No, sir, I am referring to the line from Parker substation to Gene. A. All right. The Parker substation 220 KV line to Gene?

Q. Yes.

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A. That is one set of values. But it is not necessarily a set of values that you would have coming into Highgrove. It does not necessarily mean that any part of it coming into Highgrove is on that line.

Q. Well, that was not the only value which I mentioned in my question. The readings which I mentioned were the readings received—of power received from Davis at Parker Dam substation, and the amount of power being delivered to MWD by the USBR near Parker Dam substation, and the kilowatt hour reading at the Highgrove substation? A. No. You would need to know the megawatt reading coming from MWD Hoover.

Q. Why is that so, Mr. Sample? A. Because it is part of your out of state energy.

Q. Wouldn't the energy coming from MWD Hoover be measured at Highgrove? A. Yes.

Q. Then you wouldn't need the MWD Hoover reading? A. To say that it was out of state energy?

Q. Well, yes, in determining the out of state power reaching the Highgrove substation. A. You would say

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there was out of state power reaching Highgrove substation, but you wouldn't know from what source.

Presiding Examiner: Mr. Everett, is this a good place to recess until morning?

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Mr. Everett: All right, sir.

Presiding Examiner: The court will be in recess until ten in the morning.

(Whereupon, at 4:30 o'clock p.m., the hearing was recessed, to reconvene at 10:00 o'clock a.m., Thursday, May 5, 1960.)

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THURSDAY, MAY 5, 1960

The above-entitled matter came on for further hearing, pursuant to recess, at 10:00 o'clock a.m.

BEFORE:

HARRY W. FRAZEE, Presiding Examiner.

APPEARANCES:

(As heretofore noted.)

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PROCEEDINGS

Presiding Examiner: The hearing will come to order.

After a brief examination of the Case Law and the appropriate statute, the Federal Power Act, it is the judgment of this Examiner that he would be remiss in his responsibilities to the City of Colton, to the California Commission, to Edison, and to this Commission if he were to reject or refuse to admit evidence concerning the de minimis amount of energy being received from out of state sources by Edison and sold by Edison to the City of Colton for local distribution.

In the Connecticut Light & Power Company case, 324-US-515, the Supreme Court said that only about one-fifth of one per cent of all the energy received and generated was transmitted out of the State.

In the matter presently before me, it would appear that a very small amount of electric energy is being received by Edison from out of state sources as compared with its total system sales.

The Court went on to say in the Connecticut case that Congress appears to have left to the Commission's sound administrative discretion to determine whether or not to assert its authority in such situations.

It therefore becomes an administrative determination which can only be exercised by this Commission whether or not in such cases to assume jurisdiction. Courts pass upon

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legal justification of this Commission's administrative determinations as expressed in their opinions. Therefore, acting on the motion of Counsel for Edison at page 446 of the record, whereby he again offers Exhibit 16, which was heretofore rejected by this Examiner at page 302 of the transcript, and upon reconsideration of such ruling and the current motion, Exhibit 16 is now admitted into evidence and the ruling of the Examiner at page 302 of the transcript rejecting Exhibit 16 is herewith set aside and reversed.

The motion of Counsel for the City of Colton to strike certain testimony in this record and their objections to Exhibit 29 are overruled.

Now, with regard to Exhibit No. 30, it seems to me that the record is replete with evidence that the California Commission have historically exercised jurisdiction over

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the sales of energy by Edison to the City of Colton and if Counsel are willing to stipulate to that, then Exhibit 30 would have no place in the record.

Mr. Goldberg: We are not willing to enter into any stipulation.

Presiding Examiner: In which event, the motion of the City of Colton to strike certain testimony with regard to Exhibit No. 30 is overruled.

Mr. Goldberg: Mr. Examiner, I don't propose to argue the ruling. I simply want to for the sake of emphasis point

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out that in our opinion the Examiner's premise in vacating his objection to Exhibit 16 and in admitting the exhibits offered by the California Commission is erroneous in that the Examiner references his conclusions by reference to total generation on the system, which is utterly irrelevant to the problem we have before us.

Presiding Examiner: You can argue that to the Commission.

Mrs. Pajalich: Mr. Examiner——

Mr. Goldberg: We expect to argue it to the Examiner first.

Mrs. Pajalich: May I very respectfully Mr. Examiner, point out that in your ruling you use the phrase "energy" —I have it jotted down here "and sold"—that is interstate energy, "and sold to the City of Colton for distribution." I think that has yet to be proved, Mr. Examiner, and that is the ultimate conclusion to be reached in this instance.

Presiding Examiner: Well, the implication of this hearing goes even beyond the sale to the City of Colton. The fact that Edison has in its wholesale distribution lines

energy from out of state sources might be sufficient for this Commission to consider taking jurisdiction.

I understand not only from your witnesses but from others that once this gets beyond a certain point in the Edison system that it is no longer identifiable, so——

Mrs. Pajalich: But that doesn't prove that any of it

gets into Colton, Mr. Examiner, and that we deny.

Presiding Examiner: Well——

Mrs. Pajalich: And while I am on the subject, may I ask that the record be corrected in one instance, at page 512, beginning at line 13. Mr. Goldberg was questioning the witness and said "and doesn't your general familiarity with that area tell you that when Hayfield energy gets on the transformer banks A and B that the energy must get into the City of Colton," and I objected on the grounds that there was no basis for that question and that there was no evidence to support the question when it gets on the banks and said it should be "if it gets on the banks" and Mr. Goldberg replied, "I will stand on when. I think the record shows the when."

Then the transcript reads as if I had agreed with Mr. Goldberg, which is definitely not the case. The Presiding Examiner overruled the objection to which I acceded. I did not accede to Mr. Goldberg's suggestion that the record shows that any out of state energy got on the transformer banks. I would ask that lines 22 and 23 be transposed so that the record will show that I am yielding as gracefully as possible to the Examiner's ruling but not acceding to Mr. Goldberg's definition of what is in the record.

Presiding Examiner: Let the record show that lines 22 and 23 will be transposed, that what is now line 23 will

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become line 22 and what is now 22 will be number 23.

Mr. Goldberg: And we had better make that "Mrs.".

Presiding Examiner: Are there any other preliminary matters?

If not, Mr. Sample.

Are you ready, Mr. Everett?

Mr. Everett: Yes, sir.

Whereupon,

EARL SAMPLE

resumed the stand and testified further as follows:

Cross-Examination (resumed)

Mr. Everett: Would the reporter please read the last question and the answer to that question of yesterday?

Presiding Examiner: You will find it in your record, I think, of yesterday.

Mr. Bury: I have shown the witness a copy of yesterday's transcript so he could read the last question and answer.

Mr. Everett: Thank you, Mr. Bury.

By Mr. Everett:

Q. Mr. Sample, yesterday in response to my last question, I believe you said that there was out of state power reaching Highgrove substation but you wouldn't know from what source? A. From what individual source.

Q. If that power reaching Highgrove, Mr. Sample, was

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not from Parker Dam then it would be out of state power, would it not? A. Yes, that is right.

Q. Mr. Sample, is it not true that the deliveries of power near Parker Dam substation by USBR to MWD are entirely dependent upon MWD's entitlement of approxi-

mately one-half the generation at Parker Dam? A. I don't know that they are.

Mr. Bury: What does Counsel means by "depend upon"?

By Mr. Everett:

Q. Is it not true, Mr. Sample, that the electric energy and power that MWD is entitled to receive from USBR near Parker Dam substation arises out of MWD's privilege to receive approximately half the generation of Parker Dam?

Mr. Bury: Your Honor, I object to that question. That is beyond the scope of the direct examination of this witness. Mr. Montgomery is the witness who testified as to contractual arrangements and entitlements to power of the parties and not this witness.

Mr. Everett: Mr. Examiner, I believe the record will show that this witness testified he heard Mr. Montgomery's testimony and got the impression that he had no question about it.

Mr. Bury: That doesn't qualify him, the fact that he heard the testimony doesn't permit him to be cross-examined

on it.

Presiding Examiner: Read me the question, Miss Reporter.

(The question, as reported was read by the reporter.)

Presiding Examiner: The objection is overruled.

The Witness: I don't know.

By Mr. Everett:

Q. Is it your testimony, Mr. Sample, that in preparing this Exhibit 11 which represents seven studies that you were not aware of the fact that MWD is entitled to

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receive an amount of energy which is equal to approximately one-half of energy generated at Parker Dam? A. I have been told that that is in the contract but that was not used in the preparation of the studies.

Q. When were you told this information, before you made the studies or after you made them? A. I don't remember.

Q. Well, then, you can't say that of MWD's entitlement at Parker at the time you were preparing these studies, is that correct? A. It would have no effect upon the study itself.

Q. My question was, at the time that you prepared these studies which are represented in Exhibit 11, you were not aware of MWD's entitlement to approximately one-half of the generation of Parker Dam?

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A. I said I didn't remember whether it was before or after I made the studies.

Q. Well, then, you cannot say that in preparing these studies you did take into consideration MWD's entitlement to Parker Dam energy? A. I cannot say that.

Q. Thank you.

Mr. Sample, assuming that MWD is entitled to the amount of energy equal to one-half of that, approximately one-half of that generated at Parker Dam as testified to by Mr. Montgomery, then the deliveries of power from Davis Dam to Parker Dam substation are only important in determining the magnitude of out of state energy being delivered to MWD by USBR near Parker Dam substation, is that correct? A. Could I have it from "deliveries of power from Davis Dam"—have it read, please? I am trying to make sure I understand the whole question.

(The question as recorded, was read by the reporter.)

The Witness: I think so.

By Mr. Everett:

Q. Well, under this assumption then, that is, Mr. Montgomery's testimony that MWD is entitled to approximately one-half of the Parker Dam generation, the presentation of readings at MWD Hoover Dam and State's Hoover, Southern California, BMP and Davis Dam as shown on the seven

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sheets of your Exhibit 11, are really superfluous so far as tracing the out of state energy to Highgrove, are they not?

Mr. Bury: I object to that question, Your Honor. He is assuming that conditions which actually existed on the system which Mr. Sample has presented in his exhibit should not precisely coincide with what the contracts say is entitlement and I say the two are not comparable at all.

Presiding Examiner: Well, I thought he asked him a hypothetical question.

Mr. Bury: I believe that assumption is implicit in the question.

Mr. Everett: I believe I began that question with the words "assuming MWD is entitled to approximately one-half of Parker Dam energy."

Presiding Examiner: The objection is overruled.

The Witness: With those assumptions there would have been no need for a board study to determine the line load flows and I wouldn't have been the one to be questioned on that.

By Mr. Everett:

Q. In your testimony, Mr. Sample, I believe that you stated that the time selected for studies were times when the maximum values were reported in the Staff's Exhibit 3 in the column "Davis to Parker" for each year, is that

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correct? A. Davis to Parker and the column "Parker"——

Q. I am referring, Mr. Sample, to the transcript, page 200, line 4.

Mr. Bury: The sentence starting "Among"?

Mr. Everett: Yes, sir.

The Witness: I would answer that by saying on page 211 of the transcript the criterion applied of looking for maximum values from Davis to Parker or from Parker to MWD, both.

By Mr. Everett:

Q. But you did testify, did you not, on page 200 that you selected times when the maximum values were reported in Exhibit 3 for the column Davis to Parker for each year? A. Yes.

Mr. Bury: May we have Counsel read the testimony—"Among those selected were times" et cetera?

I don't believe Counsel should be permitted to incorrectly state the testimony of the witness.

Mr. Everett: Your Honor—— the witness, Mr. Bury, has the transcript in front of him. He can read it as well as I. I don't think there is any case for misleading there.

By Mr. Everett:

Q. Mr. Sample, assuming that there does exist this limitation of power delivered to MWD from Parker as testified

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to by Mr. Montgomery, why would it be necessary to select these times when maximum values were reported in the column "Davis to Parker"? A. We could do only certain studies because of time in making this network analysis because it does involve a lot of time. So we took

what appeared to be the most adverse conditions of large deliveries from Davis or Parker to MWD to make these studies.

Q. But going on the assumption as testified to by Mr. Montgomery that MWD is entitled to an amount equal to approximately one-half only of the generation at Parker Dam, then these values with respect to the flow from Davis to Parker would not be controlling, would they? A. I don't know. I don't look at it that way.

Q. Well, would you please look at it now and state what your opinion is.

Mr. Bury: Your Honor, I am going to have to object to this line of questions. He is saying that if the witness would make certain assumptions the study would mean different things and the witness has said he did not prepare the study on those assumptions.

Mr. Goldberg: Mr. Examiner, that doesn't mean that Counsel cannot on the basis of valid assumptions that are actually supported by the record test this witness' opinions and his studies.

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Presiding Examiner: He can ask him hypothetical questions, if he wants to.

I assume that is what he is doing now, although he didn't phrase his question as a hypothetical one.

The Witness: I would have to give it study before I could say yes or no.

By Mr. Everett:

Q. Well, assuming, Mr. Sample, MWD is entitled to approximately one-half only of the generation of Parker Dam as testified to by Mr. Montgomery, then regardless of how much energy flows from Davis Dam to Parker Dam substation, MWD's amount of energy that MWD is en-

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titled to receive from USBR near Parker would still depend upon that percentage I mentioned, would it not? A. I don't know.

Q. Is there some element that I haven't mentioned in my assumption that you would need to know in order to answer that question? A. I really don't know what is in the contract.

Q. Well, I wasn't asking you to describe the contents of any contract, I was merely asking you whether in view of the fact, as testified to by Mr. Montgomery, that MWD's—assuming that Mr. Montgomery's testimony is correct, that the deliveries by USBR to MWD near Parker cannot exceed half the generation of Parker, then under those circumstances, regard-

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less of how much energy is flowing from Davis to Parker, MWD is entitled to receive the amount of energy which is equal to one-half only of the generation at Parker.

Is that not correct? A. As far as Parker is concerned, that is all that they are entitled to according to the contract. But I don't know about States Hoover, whether they have any entitlement there. That is the part that I don't know whether the line coming through Davis, they are entitled to any of that.

Q. Mr. Sample, the first hour which you selected for study which is two p.m., on July 1, 1954, is shown on Sheet 1 of your Exhibit 11? A. Yes.

Q. Would you please state the amount of electric power being delivered to MWD at Parker for this hour and for all hours on page 89 of the Staff's Exhibit 3?

Mr. Bury: What was the page number of Exhibit 3, Mr. Everett?

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Mr. Everett: Page 89.

The Witness: Are you referring to the column designated, in Exhibit 3, "Parker to MWD, megawatts."?

By Mr. Everett:

Q. Yes, sir, I am. A. Starting with July 1st, 1954, 11:00 a.m., in the column designated "Parker to MWD, megawatts, 50; for the

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time of twelve noon——

Q. Well, excuse me, Mr. Sample. It is the same for all hours on that page for this particular delivery, is it not, Parker to MWD? A. Yes, it is.

Q. And what is that amount, please? A. Fifty megawatts.

Q. Still referring to page 89 of Exhibit 3, Mr. Sample, although the deliveries from Davis to Parker vary between a maximum of 184 megawatts and a minimum of 124 megawatts, the deliveries from Parker to MWD remained at 50 megawatts or 50,000 kilowatts, did they not? A. Yes, they did.

Q. Now, that 50,000 kilowatts, is that not one-half of 100,000 kilowatt rating of Parker Dam? A. I think that the information that Mr. Miller gave was that the rating was greater than that, but I think the operating capacity of the generation at Parker Dam was 100 megawatts.

Q. Yes. Well, I think that I got my figure from Mr. Montgomery's testimony. I have a reference here to page 296 of the transcript. I think that is Mr. Montgomery's testimony.

Yes. If you look on page 296 of the transcript, Mr. Montgomery was asked did he know the approximate effective

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generating capacity or capability of Parker power plant, and his answer was: "It is approximately 100,000 kilowatts, four units."

So the 50 megawatts or 50,000 kilowatts which is the value shows (sic) throughout the Parker to MWD column on page 89, of the Staff's Exhibit 3 is then one-half of the 100,000 kilowatt rating of Parker Dam mentioned by Mr. Montgomery.

Is that correct? A. For that page, it is apparently 50.

Q. Yes.

Then, Mr. Sample, it is apparent that the selection of hour of the largest value in the column "Davis to Parker" for the year 1954 in the Staff's Exhibit 3 has no significance or effect on the actual deliveries by the USBR to MWD from Parker Dam, is that correct? A. For that page.

Q. Referring again, Mr. Sample, to page 89 of the Staff's Exhibit 3, the Staff has there reported that the maximum requirements of MWD for Gene and Intake as being 40.2 megawatts for two p.m., July 1, 1954.

Is that not correct? A. That is correct.

Q. And what requirements does your study—I am referring to Sheet 1 of your Exhibit 11—show for Gene and Intake during this hour?

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A. 40.2.

Q. I am referring, sir, to your study, Sheet 1, now. A. Sheet 1, requirements of Gene and Intake are 40.2 megawatts.

Q. Shown on your study? A. 40.

Q. 40 megawatts. Thank you.

Mr. Bury: Excuse me. Did you indicate at what point his reading of 40 occurs?

Mr. Everett: Doesn't the sheet speak for itself, sir? It says July 1, 1954, two p.m.

Mr. Bury: I meant the 40 megawatt value.

Mr. Everett: Well, the 40 megawatt value came from Mr. Sample's Sheet 1. I will mention——

By Mr. Everett:

Q. In your Sheet 1, Mr. Sample, is a study for two p.m., on July 1, 1954, is that correct? A. That is correct.

Q. Referring to Sheet 1 again, would you state the megawatts flowing from Gene and Intake to Camino? A. Measured at Camino, it is 9.8 megawatts.

Q. Thank you.

Now, would you please refer to page 89 of the Staff's Exhibit 3.

Mr. Goldberg: It might be convenient if we let you borrow

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one of our copies.

Mr. Bury: Yes, it would. I won't have to handle this big book I have with all of it.

Excuse me, Mr. Goldberg, this is not Exhibit 3.

Mr. Goldberg: I am sorry.

Mr. Everett: Would the reporter please read the last question and answer?

(The record was read by the reporter.)

By Mr. Everett:

Q. Mr. Sample, would you please refer to page 89 of the Staff's Exhibit No. 3 and state what, under the last column under heading "Davis-Parker-Camino" shows? A. 9.8 megawatts.

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Q. Thank you.

Mr. Sample, this is the same value shown on your study, is it not? A. It is the same value.

Q. You show, Mr. Sample, on Sheet 1 of your Exhibit, 50 megawatts flowing from Parker to Gene and Intake, do you not? A. Yes.

Q. Well, the 9.8 megawatts flowing from Gene and Intake to Camino is then the difference between the 50 megawatts flowing from Parker to Gene and Intake and the 40 megawatts being taken at Gene and Intake plus losses, is it not? A. Plus losses.

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Q. As shown on your study, on your Sheet No. 1? A. That is right.

Q. Well, then, Mr. Sample, this 9.8 megawatts mixes at Camino with the 88 megawatts coming from MWD's generators at Hoover to satisfy the remaining loads, is that not correct? A. It combines.

Q. Still referring to your Sheet 1 of Exhibit 11, Mr. Sample, the remaining loads, Iron Mountain, Eagle Mountain, Hayfield and Highgrove would receive this mixture of MWD Hoover and Davis Dam electric power, would they not? A. Not that I know of.

Q. Why would that statement not be correct, Mr. Sample? A. I don't know how they mix.

Q. You do not know that these energies from these sources do not mix to satisfy these remaining loads? A. No, I do not.

Q. Referring again to July 1, 1954, Mr. Sample, at two p.m., on page 89 of Staff's Exhibit 3, under the heading "Hayfield to Highgrove" do you know how the reading of 33 megawatts on the half hour and hour respectively is arrived at? A. Yes, I do.

Q. Would you please explain that to us, sir?

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A. A megawatt reading is taken at Highgrove substation and multiplied by a factor of 1.1 to simulate the condition existing at Hayfield.

Q. I take it then, Mr. Sample, that the difference represents losses? A. I think that the factor was set up to take care of losses.

Q. Thank you.

Well, then, Mr. Sample, if the 33 megawatts shown in Exhibit 3 as being received at Hayfield substation were divided by the 1.1 multiplication factor, the reading would be 30 as shown on Sheet 1 of your Exhibit 11, would it not? A. Yes, it would.

Q. And this would then be the meter reading at Highgrove? A. The 30 is the meter reading at Highgrove. It is also the meter reading on the board setting up this condition.

Q. Well, then, Mr. Sample, your calculator study represented on Sheet 1 serves only to confirm the data submitted by the Staff in Exhibit 3 for two p.m., on July 1, 1954, does it not? A. We have balanced the board to meet the conditions that were shown in Exhibit 3 for this time and date.

Q. And your study does confirm the data contained in the Staff's Exhibit 3 for this time and date?

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Mr. Bury: Your Honor, he just answered the question. He said it didn't confirm. It picked up the staff's data and used it.

Presiding Examiner: Balanced the board, which means to me that he took the Staff's figure and put it on the board?

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Mr. Bury: I was raising the question that the last question he asked was precisely the same question he asked before and had answered.

Mr. Goldberg: I would think, Mr. Examiner, the interpretation that Counsel has just put upon the answer and the Examiner's response would indicate that perhaps we do need a response to the question directly.

Presiding Examiner: Will you answer the question again, Mr. Sample.

The Witness: Could I have the question read again, please?

(The question as recorded, was read by the reporter.)

The Witness: No.

By Mr. Everett:

Q. Turning, Mr. Sample, to Sheet No. 2 of your Exhibit 11, which represents a study for November 1, 1954 at 9:00 p.m., what was the number of megawatts moving from Parker to MWD? A. 51 megawatts from Parker to the Gene and Intake.

Q. Referring again to Sheet No. 2, how many megawatts

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were moving from Davis to Parker? A. Read at the Parker end it is 16.4 megawatts.

Q. This study represented on Sheet 2 of your Exhibit 11 again shows that the movement of electric power from Davis to Parker has no effect on the delivery of the entitlement of Parker to MWD, is that correct?

Mr. Bury: May I have the question re-read please?

Presiding Examiner: Yes.

Will you read the question, please, Miss Reporter.

(The question, as recorded, was read by the reporter.)

The Witness: Not as long as we attempt to hold the values shown in Exhibit 3.

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By Mr. Everett:

Q. On Sheet 2 of your Exhibit 11, Mr. Sample, how many megawatts were moving from Parker Dam to Parker substation? A. You mean from the Parker generators?

Q. Yes, sir. A. From the Parker generators which are on the 161 KV, they are generating 100 megawatts. Through the 220 to 161 KV transformer banks the study shows there was 34 megawatts.

Q. You show on Sheet 2 then megawatts moving from Gene and Intake to Camino, do you not? A. Read at Camino, it would be ten megawatts.

Q. Taking into consideration the previous figures contained in this study mentioned by you with respect to the

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flow from Davis and the flow from Parker, approximately 3.2 megawatts of the 10 megawatts flowing from Gene and Intake to Camino would be from Davis, would they not? A. I don't know that.

Mr. Everett: Would you read that last answer, please.

(The answer, as recorded, was read by the reporter.)

By Mr. Everett:

Q. If you have approximately 16 megawatts flowing from Davis, Mr. Sample, as shown on your Sheet 2, and 34 megawatts flowing from the Parker Dam substation, and you have 10 megawatts flowing from Gene and Intake to Camino, taking those values into consideration and adding together the Davis and Parker values shown here as 16 and 34, giving a total of 50, then using that figure as a denominator and using as a numerator this Davis value of 16 and multiplying that fraction by 10 megawatts, which is the flow you show here to Camino, would you not arrive at approximately 3, the figure 3? A. Mathematically, that is correct, but electrically it is not known.

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The board would never show what—would be able to meter with different meters to find out what was coming from what place.

Q. And the balance of the 10 megawatts flowing to Camino, after subtracting the 3.2 that I mentioned, you would

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have approximately 6.8 coming from Parker then? A. Mathematically you would, but 16.4 could be used up all at Gene and Intake.

Q. The 3.2 megawatts from Davis, mixed with this 6.8 megawatts from Parker and 101 megawatts from MWD Hoover generation, less losses would make 110 megawatts to serve the succeeding loads and, finally, you would have 40 megawatts entering the Highgrove bus. Is that not correct? A. Mathematically it may be correct, but it is not necessarily electrically correct.

Q. Mr. Sample, the 40 megawatts shown entering the Highgrove bus on Sheet 2 of your Exhibit 11 is equal to the 44 megawatts corrected reading shown on page 101 of the Staff's Exhibit 3 when the correction factor you mentioned of 1.1 is applied to the 44 megawatts, is that not correct? A. That is correct.

Mr. Bury: I think you misspoke, didn't you, Mr. Everett?

Mr. Everett: Pardon me, sir?

Mr. Bury: Didn't you misspeak yourself? Didn't you mean to say that the 1.1 correction factor is applied to the 40 megawatts to make it equivalent to the 44?

Mr. Everett: Mr. Sample, sir, as you know on his Sheet 2 shows 40.

Mr. Bury: Yes.

Mr. Everett: So I believe that I stated my question

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that if Mr. Sample applied this factor—I think you said it was 1.1—to the value of 44 shown in the Staff's Exhibit 3 on page 101 he would receive a value equal to the 40 which he shows on his Sheet 2.

The Witness: If you divided the 44 by 1.1, you will come to 40.

Presiding Examiner: Or multiply 40 by 1.1 is what Mr. Bury is trying to say to you.

Mr. Goldberg: Whichever road you take you will come out in the same place.

Mr. Bury: That is right.

Mr. Everett: Have I covered that now, Mr. Bury?

Mr. Bury: I am sure we understand one another now. Everyone does, I hope.

Mr. Everett: I was simply applying this factor Mr. Sample mentioned to the figure shown in the Staff's exhibit rather than to his figure which he shows in the exhibit.

By Mr. Everett:

Q. Mr. Sample, would you state whether the sum of the megawatts taken at the transformer banks at Highgrove as shown on Sheet 2 on your Exhibit 11 total the same as reported by the Staff in Exhibit 3 of page 101? A. They do.

Q. Thank you.

Well, then, Sheet 2 of your Exhibit 11 confirms the data

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submitted by the Staff in Exhibit 3, does it not? A. The study was held to the data as shown in Exhibit 3 as we previously stated.

Mrs. Pajalich: Is the answer no, as it was heretofore, Mr. Sample? It doesn't confirm the data; it is taken from the data?

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The Witness: It does not confirm the data.

Mr. Goldberg: Is this cross-examination or redirect?

Mrs. Pajalich: No, it is clarification.

Mr. Bury: I think you will find on direct examination that he assumed the Staff data was correct and used it for the purpose of preparing the study.

Mrs. Pajalich: I was trying to get a direct answer as you did a few moments ago, Mr. Goldberg.

Mr. Goldberg: Very desirable.

By Mr. Everett:

Q. Referring again, Mr. Sample, to Sheet 2 of your Exhibit 11, which covered the hour of nine p.m., November 1, 1954, here again the hour selected for study was based on the electric power flow from Davis to Parker, was it not? A. Yes.

Q. Would you please refer to page 101 of the Staff's Exhibit 3 and state what the electric power flow from Parker to MWD was for nine p.m., November 1, 1954? A. 50 megawatts.

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Q. Will you please examine page 101 of Exhibit No. 3 and state what the electric power flow was for each hour delivered by Parker to MWD. A. On this page, it is 50 megawatts in all of that column, where any number is given in the column.

Q. Now, will you tell us what the range in electric power flow was in the column entitled "Davis to Parker." A. Tabulated in this column are values that range from 3.1 megawatts up to 9.8 megawatts.

Q. Perhaps I did not sufficiently identify the column and page. Referring still to page 101, Staff's Exhibit 3—and I believe I asked you what the range in electric power flow was in the column entitled "Davis to Parker." A. Excuse me. Tabulated in the column "Davis to Parker"

are values that appear to range from 16 megawatts up to 56 megawatts.

Q. Would you check that again, please, sir? A. Excuse me—60.

Q. So the minimum is 16 megawatts and the maximum is 60 megawatts. A. That is right.

Presiding Examiner: Mr. Everett, we will take the morning recess at this time.

(Whereupon, at 11:15 o'clock a.m. a recess was taken until 11:25 o'clock a.m.)

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Presiding Examiner: The hearing will come to order. Are you ready, Mr. Everett?

Mr. Everett: Yes, sir.

By Mr. Everett:

Q. Mr. Sample, here again the electric power flow from Davis to Parker did not affect the amount of power being delivered from Parker to MWD, did it? A. Not as long as we held to the values shown in Exhibit 3.

Q. During the hour that you selected for Sheet No. 2, that is 9 p.m. on November 1, 1954, the delivery of electric power from Hayfield was decreasing from 49 megawatts at the half-hour reading to 44 megawatts on the reading at the hour, was it not? A. As reported in Exhibit 3, the half-hour reading was 49 and the hour reading was 44.

Q. You show 40 megawatts being delivered on Sheet 2 of your Exhibit 11 from Hayfield to Highgrove. Was this reading taken on the hour? A. That reading was taken on the hour.

Q. Well, then, the 44 megawatts reported in Staff's Exhibit 3, page 101, would equal the 40 megawatts you show if reduced by the 1.1 factor which you mention. A. Yes.

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Presiding Examiner: If increased, Mr. Everett.

Mr. Everett: Well, my question was, sir, that the 44

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megawatts reported in Exhibit 3, page 101, by the staff, would equal the 40 megawatts which Mr. Sample shows on Sheet No. 2 of Exhibit 11 if reduced by the 1.1 factor.

The Witness: Yes, sir.

Presiding Examiner: Excuse me.

Mr. Everett: Not at all.

By Mr. Everett:

Q. I believe you testified, Mr. Sample, with respect to Sheet 2 of Exhibit 11 that the values for the loads of the transformer banks at Highgrove were taken from Exhibit 3. Will you state the values for the transformer banks as shown on page 101 of Exhibit 3? A. For all hours shown on—

Q. No, sir, just for the hour shown in your Sheet No. 2. A. November 1, 9 p.m., the values is 41 on the 1-A and 40 on the 2-A, mathematically that totals 81.

Q. Thank you. Will you state the values for the transformer banks as shown on Sheet 2 of your Exhibit 11. A. 40.5, 40.5, totalling 81.

Q. Turning to Sheet 3 of your Exhibit 11, Mr. Sample, on this Sheet 3 of your Exhibit 11, Mr. Sample, for the hour of 5 p.m. on July 5, 1955, what does your study show the transformer banks 1-A and 2-A at Highgrove substation taking? A. 40 and 40 megawatts.

Q. And turning to the same hour in Staff's Exhibit 3,

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page 68, would you please state what the staff reported for the same hour for Bank 1-A and Bank 2-A. A. 40 and 40, total, 80.

Q. And that is megawatts, of course. A. Megawatts.

Q. Then these readings are the same, are they not? A. They are the same numbers.

Q. Now, what do you show as the power flow from Davis to Parker for this hour? Referring to Sheet 3. A. Referring to Sheet 3, of the exhibit 1, I show 156 measured at Parker for the megawatt delivery.

Q. Thank you. And what does Exhibit No. 3, page 68, show for this hour? A. Davis to Parker, 155 megawatts.

Q. And what does your study show for the electric power flow from Parker to Gene? A. 66 megawatts.

Q. And what does the Staff's Exhibit No. 3, page 68, show? A. 65 megawatts.

Q. What does your study show as the electric power flowing from Gene to Camino? A. Measured at Camino, 24 megawatts.

Q. And what does Staff's Exhibit No. 3, page 68, show? A. 24.8 megawatts.

Q. Mr. Sample, considering the 2 per cent error

possible in your calculated studies mentioned in your earlier testimony, the results shown on your Sheet 3 of Exhibit 11, and the figures in the Staff's Exhibit 3 agree, do they not? A. No. Two percent was the accuracy of the metering—not necessarily the accuracy of the figures put into the study.

Q. On page 215 of the transcript, Mr. Sample, lines 16 and 17, you stated that the inherent error in the board, including the meters, is 2 per cent or less. A. That is correct.

Q. Would it not be fair to say, Mr. Sample, with regard to this statement of yours appearing on page 215

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of the transcript, that you have said that there are errors in the board as well as in the meters? A. There are leads, coils, other equipment, within the board itself which, along with the meters, gives the inherent error of the board of the magnitude of 2 per cent or less. The board will not compensate for human error for the values put in.

Q. To what extent, Mr. Sample, do the readings shown in Exhibit 3 differ from those shown on your Sheet 3 of Exhibit 11? A. Those figures shown on Exhibit 3, and the figures shown on page 3 of Exhibit 11 were attempted to be held to the same, because the values that were obtained throughout the system could not be balanced, as stated in the direct testimony, and so of necessity we held to one set of figures, which was Exhibit 3, and balanced the board by adjusting other figures, some

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supplied by USBR, some by Edison, some by MWD.

Q. Well, the figures do agree, do they not? A. By holding the board to those figures, they agree.

Q. Well, then, the figures shown on your Sheet 3 of Exhibit 11 do agree with the figures in Exhibit No. 3. A. Yes, they do. The figures agree.

Q. Mr. Sample, would you tell us from your calculator study the amount of electric power Edison was receiving from MWD at Highgrove during this hour you have chosen as an example in this study, Sheet 3 of Exhibit 11, whose only objective is to determine whether out of state power is included in the sale by Edison to the City of Colton. A. This shows 1 megawatt being delivered from Highgrove to Hayfield.

Q. Well, how much was Edison receiving from MWD at Highgrove during this hour? A. The reason this study was chosen at this time is because this was the

time of the largest value recorded in Exhibit 3 under the column entitled "Davis to Parker." In fact, that is the largest value reported by them for the year—the highest for the entire test period, for the value from Parker to MWD, in the column designated "Davis, Parker, Camino."

Q. But, Mr. Sample, referring to your Sheet No. 3, what was the amount of electric power that Edison was receiving from MWD at Highgrove in this study?

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A. Zero—minus-1 being received in megawatts, because it was all being used up in the pumps.

Q. You say, then, that there was no energy being received by Edison at Highgrove from Hayfield at this hour shown in Sheet 3? A. That is right—even though it was the largest delivery from Parker to MWD reported in Exhibit 3.

Q. So in other words you have chosen an hour when no electric power was reaching Edison from MWD, although the whole study is based on tracing electric power flows from MWD to Edison to determine if there was out of state power involved in the sale to the City of Colton by Edison.

Mr. Bury: Your Honor, I have to object to the characterization of the exhibit. I think it is very argumentative.

Mrs. Pajalich: It assumes that some of the energy went to Colton.

Mr. Bury: It is not necessary to the question. It is just an added argument tacked on to the end of the question.

Presiding Examiner: He says from Highgrove to Hayfield on this particular date and hour, rather than from Hayfield to Highgrove.

Mr. Everett: Yes, sir. And staff understood that the purpose of this study made by Mr. Sample was to deter-

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mine whether there was any out of state energy being delivered by MWD to Edison included in the sale to Colton.

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Mr. Bury: Your Honor, I do not think that is a correct statement of what the exhibit was prepared for. I think that is Mr. Everett's characterization of it. The witness testified these are board studies prepared from certain data on samples selected according to certain standards which the witness has announced. I do not think the witness has characterized the exhibit in that way.

Presiding Examiner: That is the way I understand it.

Mr. Bury: Of course, the exhibit speaks for itself, what it shows.

Mr. Everett: Mr. Examiner, on page 222 of the transcript, Mr. Bury was apparently explaining the purpose of the studies represented in Exhibit 11, and among other things he stated, beginning on line 23, "I think they"—and there I will take the liberty of stating I assume he meant by "they" the studies—"help establish one thing, of course, which we have stipulated which is that the energy generated at Hoover does reach Highgrove substation."

I think that in view of that statement by Mr. Bury, it is reasonable for the staff to assume that this study would carry out that purpose, select an hour when there was energy being received by Edison from MWD.

Mr. Bury: My characterization was "they"—collectively. The exhibit does show that, the same as we have stipulated. I do not think any statement says that each and every study

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proves that very same fact. This happens to be an instance when that did not occur.

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Mr. Everett: I was under the impression Sheet No. 3 was one of the studies in Exhibit 11.

Mr. Bury: I think we are getting into a matter of semantics. When I say "they" I mean the exhibit collectively. I think the staff will certainly admit there are many, many hours—all of the hours not shown in Exhibit 3—in which energy does not reach the Edison system from MWD. They have included every one they could find during the test period.

Presiding Examiner: I did not make any ruling. The exhibit speaks for itself. There are a number of sheets to the exhibit, and this one happens to show that there was a flow of energy from Highgrove to Hayfield on July 5, 1955 at 5 p.m. in the amount of 1 megawatt, mathematically.

By Mr. Everett:

Q. Mr. Sample, referring to page 68 of Staff's Exhibit 3, will you state the amount of electric power being delivered to Edison by MWD, starting at 3 p.m. on July 5, 1955 through 5 p.m. of the same day, for the half-hour and hourly readings. A. In the column designated "Hayfield to Highgrove," half-hour and hour in megawatts, under "Half-Hour" 44, 44, 44. Under the column designated "Hour" 44, 44, 0. That is for the times 3 p.m., 4 p.m. and 5 p.m. respectively.

Q. Thank you. Now, then, the flow of power was steady

at 3 and 4 p.m., but it changed from 44 megawatts or 44,000 kilowatts at 4:30 p.m. to 0 at 5 p.m., is that correct? A. Apparently.

Q. Well, in selecting 5 p.m. as the hour for your study shown on Sheet 3 of Exhibit 11, you not only selected an hour when no electric power was being received by

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Edison at Highgrove from MWD, but you also selected an hour when the loading changed from 44 megawatts, or 44,000 kilowatts, to 0, or an hour when the conditions were changing rapidly on the systems of both Edison and MWD, did you not? A. I picked the time that was reported in the staff engineering report for the highest value of the entire test period for Parker to MWD, and at that time there was 0 being delivered to Highgrove from Hayfield.

Q. And the conditions were changing rapidly on the systems of both Edison and MWD at that hour, were they not? A. It changed from 44 at the half-hour previous to 0 at the hour, and to 5 at the hour—half-hour following.

Q. Mr. Sample, the staff's Exhibit No. 3, page 68, clearly shows that at 5 p.m. on July 5, 1955, no electric power was being received by Edison from MWD, does it not? A. I misspoke. That is at 7 p.m. I said 5. Excuse me. 6:30 would be the half-hour before 7. So it would be at 6:30.

Mr. Bury: Mr. Sample, did you hear Mr. Everett's last question? I mean you were just this moment correcting an

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answer to a prior question and missed his last question.

Mr. Everett: That's all right. I will repeat my last question.

By Mr. Everett:

Q. Have you completed your answer to the prior question? A. Yes.

Q. I think my last question was that the Staff's Exhibit 3, page 68, clearly shows at 5 p.m. on July 5, 1955 no

electric power was being received by Edison from MWD, does it not? A. The staff's exhibit shows that.

Q. Was this hour of 5 p.m., July 5, 1955, the only hour which you could find to demonstrate your conclusions as testified to from Sheet 4 of Exhibit 11? I am referring to your testimony on pages 213 through 215 of the transcript. A. No.

Q. Well, why did you not select another hour, then, when there was energy going into Highgrove? A. I chose this hour because it was the largest being delivered to MWD—Parker to MWD.

Q. Mr. Sample, in all your calculator studies, except this one on Sheet 3, you have relied on electric power flows from Davis to Parker, but this one, on Sheet 3, you select as a basis for your study the flow of electric power from Parker to MWD, is that correct? I am referring there to your testimony on page 212 of the transcript.

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A. No. On page 6 of the exhibit it is for both the highest value reported in the column designated "Davis to Parker" for the year 1956, and in fact for the entire period studied, and it was also the largest value reported that day for Parker to MWD.

Q. Isn't Sheet 3 the only study where you relied solely on the flow from Parker to MWD? A. I think so, because it is the largest value in the entire exhibit.

Q. Thank you. Mr. Sample, since your calculator study in the first three sheets of Exhibit 11 agrees with the data in Exhibit 3, Staff's Exhibit 3, and you say your study is within 2 per cent correct, then the readings taken from Edison's records should be accurate within this percentage, should they not? A. No.

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Q. Why not, Mr. Sample? A. I have stated that the board, the inherent error in the board, was 2 per cent. I have not stated that the error of the study is within 2 per cent.

Q. Mr. Sample, how accurate are the readings taken from Edison's records? A. The accuracy of the readings taken from Edison records—I assume you mean that the staff took physically from Edison's records.

Q. Yes, as shown in Exhibit 3.

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A. Well, we feel after checking them over that they are accurate.

Q. Well, then, Mr. Sample, since your calculator studies represented on the first three sheets of your Exhibit 1 agree with the data in Exhibit 3, and you have said that your board studies were within 2 per cent correct, or that the board is within 2 per cent correct, then the readings taken from Edison's records should be accurate within this percentage, should they not? A. No, not necessarily.

Q. Why not necessarily, Mr. Sample? A. In setting up the board, in order to use these values—for example, on Sheet 2, the figures supplied by the USBR undoubtedly to the staff, in order to fill in their column of Davis to Parker, read at Parker, 16. The USBR also supplied information to Edison on the same line, Davis to Parker, read at Davis of 34. With the resistance values, impedance of the line and the megawatts flowing in it, it is impossible to have a 50 per cent drop in that line.

Q. But your prior testimony today showed that your studies on the first three sheets of your Exhibit 1 did agree with the data in Exhibit 3. You compared the values shown on your Sheet with those in Exhibit 3, and you

testimony shows that they did agree. A. We have balanced the board to agree with the values

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shown on Sheet 11. I mean Exhibit 11.

Q. Well then your calculator studies are not—do not reflect accurate conditions. A. They reflect the information that has been given to us adjusted to an instantaneous value which we assume the staff engineering report to be the factual readings of those meters, and have adjusted other meters in order to make the balance of the board.

Q. Do your calculator studies accurately reflect the true conditions? A. For the information that is put into the board.

Q. Is inaccurate information put into the board? A. We have already stated that in obtaining information on some past time, that in reading indicating watt meters from many sources, that there is a time interval from when all readings would have been taken, so that it is not in any instant simultaneous readings.

Q. Is it your testimony, then, that the meters and the recorded data taken from them on the Edison system are inaccurate and unreliable? A. No. I do not think I have said that.

Q. Well, was it your intention to say that? A. It was not my intention to say that the readings of the individual meters was inaccurate.

Q. Mr. Sample, would you please turn to page 215 of

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the transcript, line 7 through 7. A. Yes.

Q. Excuse me, Mr. Sample. It is page 218 of the transcript, line 4. Did you not say there that there are inaccuracies in meters and in their readings? A. Yes, I did.

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Q. Well, are the meters and the recorded data taken from them on the Edison system inaccurate, or unreliable? A. Not to the extent that they are used.

Q. I didn't catch that. A. Not to the extent that the readings are used.

Q. How would one know in using a reading whether it was accurate and reliable or was not? A. Meters are tested to a certain degree of accuracy. I do not know the exact figure.

Q. Does Edison maintain its meters at that degree of accuracy? A. What degree of accuracy?

Q. The one that you have mentioned. A. The degree of accuracy of the board?

Q. No, sir. I am not talking about the calculator board now—just about the meters, meters which are not involved in the calculator board. A. To what degree of accuracy?

Presiding Examiner: Mr. Everett, it does not appear to me

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that you and the witness are talking about the same thing. You have been examining the witness on Sheets 1, 2 and 3 of his Exhibit No. 11.

Mr. Everett: Yes, sir.

Presiding Examiner: He says that the data which he used on Sheets 1, 2 and 3 he got out of your engineering report. You find that on page 212, line 17.

Now, when he comes to Sheet 4, he is using some data that he did not get out of your engineering report. You find that on page 213, commencing at line 11. And what you are attempting to examine him on now, the accuracy of the meters, is with regard to the information on Sheet 4, and not 1, 2 and 3, as I get the picture.

Mr. Goldberg: Mr. Examiner, as I read transcript 214, line 4, that is a general statement.

Presiding Examiner: Yes, but it is in regard to Sheet No. 4.

Mr. Goldberg: It is a general statement, an expression of a view of this witness that there are inherent errors in meters and in their reading. Now, the witness has stated that he does not recall what the degree of accuracy is to which meters are maintained.

Presiding Examiner: But doesn't he say on Sheets 1, 2 and 3 he took the data right out of staff's engineering report and put it——

Mr. Goldberg: Some of the data. He used a great deal of

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other data which he has put into the sheets.

Mr. Cragun: It appears at page 200, 201 of the transcript—some of the other sources he used, Mr. Examiner.

Mr. Goldberg: For example, he had obtained the resistance and reactance of each segment of the line. He has used data beyond which appeared in the staff engineering report. But as I understood the question of counsel for the staff, which related to this general proposition at line 4, transcript 214, that there are inherent errors in meters and in their reading, and maybe he was using that as an explanation as to why he went to some other sources —the staff is seeking to ascertain whether the meters of Edison are maintained as accurately as they can be maintained. That is the pending question, as I understand it. And obviously he must know the answer to that.

Presiding Examiner: In my opinion, it refers to Sheet No. 4 and not to 1, 2 and 3, on which the witness has just been examined. He has not been examined yet on Sheet 4.

By Mr. Everett:

Q. Mr. Sample, referring to Sheet 4 of your Exhibit 11, you changed the generation at Davis Dam from 212

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megawatts, as shown on your Sheet 3, to 217 megawatts, and the deliveries to the 220 kv 161 kv bus at Parker Dam Substation from 90 megawatts, as shown on Sheet 3, to 86 megawatts, is that not correct? A. Yes, that is correct.

Q. Now, would you state what difference this made in the

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electric power being received at the Highgrove Substation. A. On Sheet 3 it shows 1 megawatt being sent from Highgrove to Hayfield. On Sheet 4 it shows 1 megawatt being sent from Hayfield to Highgrove.

Q. Thank you. Well, then, the big difference between —and the principal difference between—Sheets 3 and 4 it seems to me is that the change in the direction of flow at the Highgrove Substation of 1 megawatt of power, is that correct? A. That is a change. I do not know that it is the principal change.

Q. Mr. Sample, in view of your testimony on page 214 of the transcript, that there are inherent errors in meters and in their reading, what assurance do you have that the meter readings on which you base your study on Sheet 4 are any more reliable than the data taken from similar meters by the staff? A. Will you read that question over again, please.

(The question, as recorded, was read by the reporter.)

The Witness: I have no assurance that there is any change.

Mr. Everett: Would you read that answer back to me, please.

(The answer, as recorded, was read by the reporter.)

By Mr. Everett:

Q. Now, since you have testified, Mr. Sample, on page 215 of the transcript, that a variation of 6 or 7 megawatts

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is not unusual, then the data showing interstate flow of electric power as reported in Staff's Exhibit 3 could be 6 or 7 megawatts more

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than shown there, could it not? A. I'm sorry to ask again for it to be read, but could I have it read back.

(The question, as recorded, was read by the reporter.)

The Witness: No, these are individual readings.

By Mr. Everett:

Q. Are not these readings in the Staff's Exhibit No. 3 individual readings? A. Yes, they are individual readings, and are not necessarily simultaneous.

Q. Well, inasmuch as they are not simultaneous, then couldn't they be 6 or 7 megawatts more than reported in Exhibit 3? A. It could possibly be.

Q. Well, Mr. Sample, if it is not uncommon or surprising that there are inherent errors in meters and their readings as you have testified on page 214 of the transcript and would have us believe, then there could be sizeable error in the billings by Edison to the City of Colton, could there not? A. Sizeable errors in the billings, the kilowatt hours, to the City of Colton?

Q. Yes, that is correct. That was my question. A. I do not think so.

Q. But you have testified that it is not unusual or uncommon to have a variation of 6 or 7 megawatts in readings.

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A. On a whole system.

Q. And you have testified that there are inherent errors in meters and in their readings. A. That is one of the things that I have testified to in errors.

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Mr. Everett: Mr. Examiner, would this be an appropriate time for the noon recess?

Presiding Examiner: We will take the noon recess at this time.

(Whereupon, at 12:30 o'clock p.m. a recess was taken until 2:00 o'clock p.m. of the same day.)

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AFTERNOON SESSION

2:00 P.M.

Presiding Examiner: Come to order, please.

Whereupon,

EARL SAMPLE

resumed the stand and testified further as follows:

Presiding Examiner: Are you ready, Mr. Everett?

Mr. Everett: Yes, Mr. Examiner, we are.

Cross-Examination—resumed

By Mr. Everett:

Q. Mr. Sample, on Sheet 3 of your Exhibit 11, will you state the number of megawatts shown reaching Parker from Davis, please? A. 156 megawatts.

Q. Thank you.

Will you state what you show as the megawatts reaching Parker from Davis on Sheet 4 of your Exhibit 11? A. 160 megawatts.

Q. Thank you.

What do you show as the electric power flow on Sheet 3 from Parker to Gene? A. 66 megawatts.

Q. And what do you show on Sheet 4 for the electric power flow from Parker to Gene? A. 72 megawatts.

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Q. Mr. Sample, both Sheet No. 3 and Sheet No. 4 of your Exhibit 11 are for the same date and hour, namely,

July 5th, 1955, at five p.m., are they not? A. That is right.

Mr. Everett: Mr. Examiner, the Staff at this time requests that there be identified as an item by reference for incorporation into the record a letter dated March 4, 1960, on the letterhead of the United States Department of Interior, Bureau of Reclamation, Parker Davis Project office, addressed to Mr. Leonard Eesley, Assistant General Counsel, Federal Power Commission, and signed by Otto K. Mangum, Acting Project Manager, to which letter there is attached a certified copy of a sheet entitled "U.S. Department of the Interior, Bureau of Reclamation, Parker Dam Power Plant, Transmission Lines and Bus Data Miscellaneous," dated July 5th, 1955, which letter and attached sheet are contained in Federal Power Commission formal file, Part 1, in Docket No. E-6821.

The Staff requests, Mr. Examiner, that this letter and its attached Sheet be identified as one item.

Presiding Examiner: It will be marked Item M for identification.

(The document referred to was identified as Item M by reference.)

Mr. Everett: Pardon me, sir.

Presiding Examiner: M.

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Mr. Bury: May I ask Counsel if copies of this can be made available to us?

Mr. Everett: Yes, sir. I shall distribute copies right away.

Mr. Bury: Fine.

By Mr, Everett:

Q. Mr. Sample, do you have Item M for identification before you? A. Yes, I have.

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Q. Would you please state what megawatts are shown reaching Parker from Davis at five p.m., on July 5, 1955 as shown on Item M for identification? A. Under the column headed "Davis Line" and the column "Megawatts five p.m.," is the value 155.

Q. Thank you.

Well then, Mr. Sample, the 156 megawatts and the 160 megawatts reported by you on Sheets 3 and 4 of your Exhibit 11 were not actually reaching Parker from Davis at five p.m., July 5th, 1955, were they? A. Excuse me. Would you read that over, please?

(The question, as recorded, was read by the reporter.)

The Witness: The value 155 that appears in both the reference M and in the Staff Engineering Report, Exhibit 3, was the value that we attempted to put on to the board and in the case of Sheet 3 of Exhibit 11, that value was read on

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the meters on the board after having balanced the board as 156.

Q. Well, Mr. Sample, according to Item M, the actual number of megawatts reaching Parker from Davis at five p.m., on July 5th, 1955 was 155? A. That is correct.

Q. Referring, Mr. Sample, to Item M for identification, would you state what it shows was being delivered to MWD at Parker at five p.m., on July 5th, 1955? A. Under the column designated "MWD tie line, megawatt one hour, five p.m.," is value 65.

Q. That is 65 megawatts? A. Yes.

Q. Well, then, the 65 megawatts recorded by the operators at Parker Dam at five p.m., July 5th, 1955 as shown on Item M for identification does not agree with Sheet 3 of your Exhibit 11 which shows 66 megawatts being delivered to MWD or Sheet 4 of your Exhibit 11 which shows

72 megawatts being delivered to MWD at this hour, is that correct? A. That is correct.

Q. Would you now turn, please, to page 68 of the Staff's Exhibit No. 3 and state what it shows for the power flow from Davis to Parker and Parker to MWD at five p.m., on July 5th, 1955? A. Under the column designated Davis to Parker, mw,

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is the value 155 for July 5th, and under the column designated Parker to MWD in megawatts is the value 65 for July 5th, five p.m.

Q. Thank you.

Q. Well, then, these amounts in Exhibit 3 are the same amounts as shown in Item M for identification for the data taken at Parker Dam at five p.m., July 5th, 1955, are they not? A. They are.

Q. Now, you testified, Mr. Sample, on page 213 of the transcript, beginning, I believe, at page—excuse me, beginning at line 11, and I quote: "Sheet 4 shows results of another study for July 5, 1955 at five p.m. This is the same time covered by the study shown on Sheet 3. This study, however, was prepared tying it to the data supplied from USBR and Hoover records rather than to the data in the Staff Engineering Report or Exhibit 3."

And then, Mr. Sample, I believe, you continued on page 214 of the transcript and there stated, and I quote again: "In this study represented on Sheet 4, we held to the data supplied by USBR and from Hoover and then with the system in balance we read from the calculator the values for Davis to Parker and Parker to MWD."

Mr. Bury: Excuse me, Mr. Everett. What was the page of the transcript you were last reading from?

Mr. Everett: Page 214, Mr. Bury.

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By Mr. Everett:

Q. Now, these values shown on Item M for identification and the values used on Sheet 4 of your Exhibit 11, do not correspond, do they? A. They do not.

Q. And the values shown on Item M for identification are actual flows, are they not? A. They are recorded values taken at Parker Dam.

Q. And they are not the amounts which you calculated? A. They are not the figures that were given to Edison by USBR for values taken at Davis Dam.

Q. I believe you testified, Mr. Sample, that there is an interval of time of at least three or four minutes between meter readings and that during this interval there are changing load conditions at the various locations, did you not? I think that is on page 214, line 6. A. That is the way it reads, is the data recorded are general records of reading of indicating watt meters and the number of recorded values are being used. These are inherent errors in meters and in their reading. Of course, all readings are not taken simultaneously. It is expected that there will be a time lag of at least three or four minutes between the time of first and last reading of these meters at various locations.

Q. You also went on to say that during this interval

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there are changing load conditions at various locations? A. That is right.

Q. Mr. Sample, would you please refer to page 35 of the Staff's Exhibit 3.

And on the date of September 3, 1955, at 11:00 a.m., through 9:00 p.m., or a continuous period of eleven hours, would you tell us what electric power was being received

at Highgrove from Hayfield? A. As tabulated here from September 3rd, 11:00 a.m., through September 3rd, 1:00 p.m., the value of five in the megawatt column, Hayfield to Highgrove.

Q. Well, what difference would three or four minutes mean in reading the meter at Highgrove during this period have in steady electric power flow? A. In this instance, this value of five was read supposedly on the hour or the half hour. I do not know what the value would have been five minutes before the hour or half hour.

Q. Well, this flow was continuous for a period of eleven hours, was it not? A. Not necessarily. When these readings were taken, the value shows there was five.

Q. Doesn't this data which appears on page 85 of the Staff's Exhibit 3 indicate that the flow was steady during this period?

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A. It indicates that at the half hour and hour readings through eleven a.m., through nine p.m., for those twenty-two time intervals the reading was five.

Q. Well, is it likely that the two systems would be operated in such a way that the flow would be unsteady during that period? A. I don't know.

Q. Well, what is your judgment? A. I do not know the operation of those systems specifically over this period of time.

Q. Would you turn now, please, to page 78 of the Staff's Exhibit 3.

Under the date of August 5, 1955, at 10:00 a.m., through 4:00 p.m., or a continuous period of seven hours, will you state the amount of electric power flow being received at Highgrove from Hayfield? A. For the column designated Hayfield to Highgrove, under the one half hour

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reading and the hour reading, starting with 10:00 a.m., and going to 4:00 p.m., is the value 88 appearing in each one of the spaces.

Q. That is 88 megawatts? A. 88 megawatts.

Q. And that is through 4:00 p.m., is it not? A. Through 4:00 p.m., for the time intervals.

Q. What difference would interval of time between

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reading meters mean during this period? A. I do not know what the reading would have been five minutes before the half hour or after the half hour or five minutes before the hour or after the hour.

Q. Well, would an interval of time between the reading meters during this period make any difference? A. I don't know.

Q. Turning to page 31, Mr. Sample, of the Staff's Exhibit 3, in starting at 8:00 a.m., through 8:00 p.m., on January 10, 1958, would you please state the amount of electric power flowing from Hayfield to Highgrove during this continuous thirteen-hour period? A. Under the column designated Hayfield to Highgrove, one half hour an (sic) hour, there is tabulated the figures starting with 8:00 a.m., and running through 8:00 p.m., the value of 110 in each one of the spaces.

Q. Yes. That is 110 megawatts? A. That would be 110 megawatts.

Q. A small interval of time between meter readings would have no effect on these readings, would it? A. I don't know.

Q. I now ask you to turn to page 26 of the Staff's Exhibit 3 and starting at 10:00 a.m., on April 14, 1958 through 10:00 p.m., on the same date would you please state the megawatts being delivered at Highgrove from Hayfield

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during this thirteen-hour period? A. Under the column designated "Hayfield to Highgrove, one half hour and hour," starting on April 14 at 10:00 a.m., and running to 10:00 p.m., of the same date appears the value of 148 in each one of the spaces.

Q. That is 148 megawatts? A. As so headed by the top of the column.

Q. Yes, and that is through 10:00 p.m., is it not? A. Through 10:00 p.m.

Q. Thank you.

Well, here again during this period of steady flow to Highgrove, a small interval of time between meter readings would have no effect, isn't that right? A. I don't know that.

Q. Mr. Sample, throughout the Staff's Exhibit 3, there are numerous instances of continuous electric power flows of the same magnitude for consecutive hours, are there not? A. Not to my knowledge.

Q. Well, there are in Staff's Exhibit 3, are there not, several instances of continuous electric power flow of the same magnitude for consecutive hours and half hours? A. There are tabulations of the same figure appearing in the one half-hour and hour columns.

Q. Mr. Sample, in preparing your study, did you make any examination of any Edison records which would show

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special situations existing on the lines between Edison and MWD for these periods covered in the Staff's Exhibit 3? A. What do you mean by "special situations"?

Q. Well, any unusual conditions that existed on the two systems during the period covered by the Staff's Exhibit 3. A. Not that I knew as unusual.

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Q. Are you aware whether there are any instructions in existence directing that there be constant flows maintained during some of these periods covered in the Staff's Exhibit 3? A. I was not aware of any.

Q. Mr. Sample, deducting electric power from Parker Dam, all the electric power received at Highgrove from Hayfield is out of State power, is it not? A. When you say "deducting the electric power at Parker Dam," you mean all of the power at Parker Dam—deducting that from the value received at Highgrove?

Q. Well, deducting the value representing power received from Parker Dam from the value representing the power received at Highgrove from Hayfield would give you the value for the out of state power, would it not? A. That is right.

Q. Well, then, during the instanees in the Staff's Exhibit 3 when there are consecutive hours of the same electric power flow, the interval between meter readings mentioned by you would have no effect, would it?

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A. I don't know.

Q. Mr. Sample, yon have testified that the connected load of the MWD pumps has exceeded the Parker to MWD deliveries at all times covered by the Staff's Exhibit 3? A. Yes.

Q. Now, isn't this statement about equivalent to saying that the total generation on the Edison system has exceeded the deliveries to the City of Colton? A. No.

Q. In your Exhibit 11 on Sheets 1 to 6, inclusive, when the electric power was moving from Gene to Camino and from MWD Hoover to Camino, the electric power moving to Iron Mountain was equal to the sum of the Gene-Camino and the MWD Hoover-Camino power flows

less losses, was it not? A. It is the mathematical sum of the two, less losses.

Q. Well, then, the power moving from Gene and the power moving from MWD Hoover mingled at Camino to serve the MWD loads and the remainder moved on to Highgrove, according to your studies, did it not? A. I don't know that they mingled.

Q. Would you prefer to say combined? A. Combined, or it is the sum of the two.

Q. I think that is the word you used this morning. A. Combined doesn't to me indicate mingling. It is the combination of two sums, the summation of two values.

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Q. Well, power moving from Gene and power moving from MWD Hoover do come together at Camino, do they not? A. They do, for the six instances.

Q. And power moving from Camino serves the MWD loads and the remainder goes on to Highgrove, does it not? A. The total.

Q. Now, on Sheet 7 of your Exhibit 11, the electric power flow is moving from Camino to Gene the reverse of the direction of flow shown on the preceding six sheets, is it not? A. Yes, it is.

Q. Now, if the flow from Camino to Gene is deducted from the flow to Camino from MWD Hoover less losses, does this not equal the flow from Camino to Iron Mountain as shown on Sheet 7 of your Exhibit 11? A. It is a subtraction of the 23.5 megawatts going from Camino to Gene from value coming into Camino from MWD, then less losses, it is the value that appears over at Iron Mountain 220 kv switch rack.

Q. Now, turning to Sheet 5 of your Exhibit 11, Mr. Sample, here again you have selected the highest value for electric power flow from Davis to Parker, have you

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not? A. The highest value during the year 1955 when the Staff reported the value in the column designated Davis to Parker.

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Q. What effect does this maximum flow have on the MWD entitlement to Parker Dam electric power concerning which Mr. Montgomery testified? A. I don't understand the question.

Q. Well, I will repeat it: What effect does this maximum flow from Davis to Parker have on MWD's entitlement to Parker Dam electric power as testified to by Mr. Montgomery? A. I don't know how it would affect the contract. I don't know about the contract.

Q. Well if, as—assuming in accordance with Mr. Montgomery's testimony that MWD is entitled to approximately one-half of the electric power generated at Parker, why would it be of any significance to choose an hour during this year 1955 when there was the maximum flow from Davis to Parker? A. We wanted to find out what was happening when the highest value was coming from Davis to Parker.

Q. But that highest value for the flow from Davis to Parker would not affect the amount of electric power that MWD was entitled to receive from USBR at Parker, would it? A. I don't know.

Q. Well, I mean assuming that Mr. Montgomery's testimony is correct? A. That they are entitled to 50 megawatts?

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Q. That they are entitled to a specified percentage, I think he said approximately 50 per cent or approximately one-half of the—that MWD is entitled to approximately one-half of the Parker Dam generation? A. I don't know that it would have any effect. We are picking the

value that was the highest in the delivery. We could only pick certain ones, had only a certainly (sic) amount of time to make the studies.

Q. Would you please state the amount of electric power, Exhibit 3, page 69, shows for 6:00 p.m., on July 9, 1955, the hour covered by Sheet 5 of your Exhibit 11, as being received at Highgrove? A. On this page for July 9th, 6:00 p.m., under "Hour Reading, Hayfield to Highgrove," is the value of five, meaning 5 megawatts.

Q. Thank you. And what does your calculator study show as the electric power being received at Highgrove for the same hour? A. Five.

Q. Five megawatts? A. Five megawatts.

Q. Was the transformer loading on the Highgrove banks as shown on Sheet 5 of your Exhibit 11 the same as shown on page 69 of the Staff's Exhibit 3 for this hour? A. The value of 37 on both of the banks on Sheet 5 of

Exhibit 11 agree with the values of 37 tabulated in column 1-A and 2-A under Highgrove substations banks.

Q. As shown on page—— A. As shown on page 69 of Exhibit 3.

Q. Thank you.

But considering losses, was the reading of electric power flowing from Gene to Camino at this hour about the same in Exhibits 3 and 11? A. The values shown in Exhibit 3 under Parker to MWD is 54, on Exhibit 11, reading at——

Q. Excuse me, sir. I guess I didn't make that question clear.

My question was or I intended to say: Considering the losses, was the reading of electric power flowing from Gene to Camino at this hour about the same in Exhibit 3

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and in Exhibit 11? A. About the same one as 12.5 and the other is 13.8.

Q. Thank you.

Then the data on your Sheet 5 of Exhibit 11 agrees with the data for the same period as shown in Exhibit 3? A. The board was set up to meet the values that were shown on this line in Exhibit 3.

Q. Mr. Sample, you testified that the time of 6:00 p.m., on July 9, 1955 was selected for a study which is represented on Sheet 5 of your Exhibit 11 because this was

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the time during the year 1955 when the Staff reported the highest value for the column designated Davis to Parker? A. That is right.

Q. I am referring to your testimony on page 216 of the transcript.

Why did you not select 9:00 p.m., on that same date inasmuch as its value, as reported on page 69 of the Staff's Exhibit 3, met the criterion you used in selecting the time for this study? A. I don't know.

Q. Well, did you select the hour of 6:00 p.m. on July 9, 1955 for your study represented on Sheet 5 of Exhibit 11 rather than the hour of 9:00 p.m., on that day because there were five megawatts only flowing to Highgrove from Hayfield at 6:00 p.m., whereas there were 55 megawatts flowing to Highgrove from Hayfield at 9:00 p.m.? A. No.

Q. With respect, Mr. Sample, to Sheet 6 of your Exhibit 11 for the hour of 8:00 p.m., on April 30, 1956, you again selected the maximum flow of electric power for Davis to Parker, although this flow has no effect on MWD's entitlement to Parker Dam power, is that right? A. I wasn't concerned with MWD's power. I was going

(600)

down the column of Davis to Parker and Parker to MWD in the whole exhibit looking for the largest values.

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Mr. Everett: Read that answer back, please.

Presiding Examiner: Yes, will you read it, Miss Reporter.

(The answer, as recorded, was read by the reporter.)

By Mr. Everett:

Q. Mr. Sample, does the reading of power flow from Gene to Camino of 8.4 megawatts on Sheet 6 of your Exhibit 11 correspond to that shown on page 44 in Exhibit 3? A. It is the same value.

Q. Thank you.

If the 88 megawatts reading at Highgrove shown in Staff's Exhibit 3, page 44, for 8:00 p.m., April 30, 1956 is divided by the factor 1.1 which you mentioned this morning, it would equal, would it not, the 80 megawatts shown on Sheet 6 of your Exhibit 11? A. That is correct.

Q. As being received at this hour at Highgrove? A. That is correct.

Q. Thank you.

On Sheets 1 to 5 inclusive of your Exhibit 11, you show approximately 40.2 megawatts of electric power flowing to Gene and Intake pumping stations. Isn't that correct? A. That is correct.

Mr. Bury: What sheet was that?

Mr. Everett: On Sheets 1 to 5 inclusive.

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By Mr. Everett:

Q. Mr. Sample, what does the Staff show for the Gene and Intake loads in Exhibit 3 between July 1, 1954 and March 13, 1956? I think that the pages in Exhibit 3 would

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be pages 39 and 40, pages 47 through 105? A. I think that they all show 40.2.

Mr. Bury: Do you want the witness to check every page?

We will accept it subject to check and advise you later if it is incorrect.

By Mr. Everett:

Q. But you agree that the Staff shows 40.2 megawatts for this reading? A. Subject to check on every page.

Q. On Sheet 6 of your Exhibit 11 you show the Gene and Intake loads is 53.6 megawatts? A. That is correct.

Q. Is this the same load used by the Staff from March 22nd, 1956 through April 30, 1956 in Exhibit 3?

I believe that is pages 41 to 44, Mr. Sample—41 through 44. A. Through April 11, 1956, they record Gene requirements of 53.6 megawatts.

Q. What was your break-off date, Mr. Sample? A. For this page 44, under the date April 30th, 11:00 p.m., is the last that I can see that they record 53.6

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megawatts for Gene's.

Q. Thank you. And that last date was April 30, 1956? A. That is correct.

Q. Thank you.

Mr. Sample, on all seven sheets of Exhibit 11 you show the electric power moving toward Chino from Highgrove in substantial amounts, do you not? A. Yes.

Q. The 240,000 kilowatt Etiwanda steam electric generating plant is connected to the Chino substation by 220 KV transmission lines to Highgrove and thence from Highgrove to Chino, is it not? A. On the first, I don't know that Etiwanda is 240 megawatts.

Q. I meant to say 240,000 kilowatts. A. I don't know that it is 240,000 kilowatts.

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Q. The Etiwanda generating plant is connected to Chino substation by 220 KV transmission lines to Highgrove and thence from Highgrove to Chino, is it not? A. There is an interconnection of the 220 KV between Etiwanda and Highgrove's 220 KV switch rack, between Highgrove's 220 switch rack and Chino's 220 switch rack. There is also an interconnection between Etiwanda's 220 KV switch rack and Barre's 220 KV switch rack.

Q. Normally then, Mr. Sample, is it not true that during

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periods when electric power is being received from Hayfield at Highgrove the flow of electric power is from Highgrove to Chino as shown in your Exhibit 11? A. On these sheets of the exhibit, that is what was shown for these specific times.

Q. Well, isn't it generally true when large amounts of power are being received at Highgrove from Hayfield that the flow of electric power would be from Highgrove to Chino? A. I don't know.

Q. Mr. Sample, referring to Sheet 1 of your Exhibit 11, would you please tell us where you obtained the values for the power flows or loads between Etiwanda and Barre, Etiwanda and Highgrove, Chino and Center, Chino and Barre and Highgrove and Chino? A. Those were all obtained from the calculator boards because there are no megawatt meters on any of these lines.

Q. Would you explain how this was done on the calculator board, Mr. Sample? A. After the system had been put into the calculator board, it is a matter of pushing a button on a console for the different ends of the line whichever end of the line you would like to have a reading, there is an indicating meter which will give you directly the megawatts, and that is where he obtained them.

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Q. Mr. Sample, aren't there two circuits from Etiwanda

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to Chino, one via Highgrove and one via Barre? A. There are at least these two circuits which are interconnected which form part of the 220 KV grid between Etiwanda, Barre, Highgrove and Chino.

Q. Would the board give you the values on each circuit, that is, the circuit from Etiwanda to Chino via Highgrove and the circuit from Etiwanda to Chino via Barre? A. It would give you the value of the circuits between the 220 KV switch racks.

Q. Mr. Sample, in your testimony describing the network calculator, I believe you stated that the study of a system by use of the calculator makes possible the determination of transformer ratings, desired location of new generation, desired location of terminals and new transmission facilities among other things, is that not correct?

I am referring to pages 198 and 199 of the transcript. A. I have nothing different to say on this subject other than what I have previously stated.

Q. My statement was correct then, that you did state that? A. If that was directly read from that. I didn't follow completely what you said.

Q. I will repeat my statement again.

I said that in your testimony describing the network calculator you stated that a study of the system by use of the

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calculator makes possible a determination of transformer ratings, desired location of new generation, desired location of terminals for new transmission facilities, among other things? A. I think that is correct.

Q. I believe you also testified there was no way that the network calculator could be arranged or operated so as to identify the sources of electric power supplying loads? A. With this type of system?

Q. Is that correct? A. With this type of system, it could not differentiate between sources to multiple loads —multiple sources to multiple loads.

Q. You did testify, did you not, that there is no way the calculator could be arranged or operated so as to identify the sources of electric power supplying loads? A. If there were only one source and one load, that would be identifiable. In the case of a network where there are multiple sources and multiple loads, it is not possible for a calculator board to——

Mr. Everett: Mr. Examiner, I think my question was absolutely clear. I think it could be answered by yes or no. Either he did testify that way or he didn't.

Mr. Bury: Your Honor, I think the witness is trying to put the excerpt from his testimony back into the context

in which it was originally given.

Presiding Examiner: I gather what the witness says is that under one set of facts, which he says are not present in this case, the calculator could determine the source of the energy, but under the set of facts as exist in this case it cannot?

Mr. Everett: Sir, I was just in a sense trying to bring us up to date here on what had been said before. I am referring to page 225 of the transcript. There, Mr. Bury said, "Mr. Sample, is there any way that this AC network calculator can be arranged or operated so as to identify the loads shown here as the Highgrove 220 to 66 KV banks

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as being supplied either from SCE Hoover, MWD Hoover, Davis or any other generation shown there?"

And the witness, who was Mr. Sample, of course, replied: "No."

I think that my question as to whether he did so testify could be answered yes or no.

Mr. Bury: We stipulate that he so testified.

It is in the record.

By Mr. Everett:

Q. You do agree that you did testify that there was no way the network calculator could be arranged or operated so as to identify the sources of electric power supplying loads?

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A. No, I did not testify to that statement. I testified to identify the loads shown here as Highgrove 220 to 66 KV banks as being supplied either from SCE Hoover, MWD Hoover, Davis or any other generation shown there.

Q. Mr. Sample, is there any way that the network calculator can be arranged or operated so as to identify sources of electric power supplying loads? A. Under certain specific conditions, yes.

Q. Mr. Sample, did you prepare any studies on the calculator for any hours in the year 1958? A. Yes, I did.

Q. How many such studies did you prepare for the year 1958 on the calculator board? A. I prepared one.

Q. I notice on these studies represented on Sheets 1 through 7 they cover a particular hour on a particular date. Would you tell us what hour and date in 1958 were covered on this study? A. The date was October 15th, 1958, 6:00 p.m. However, erroneous information was put into the study and it was too late to revise the study to bring it to values that would have been in line.

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Q. Did you prepare any other calculator studies which were not included in your Exhibit 11? A. I prepared one other study on December 31, 1954 at

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10:00 p.m., and that one also had information put into the study which was incorrect and when found it was too late to revise it.

Q. But aside from these seven studies set forth in your Exhibit 11 you prepared no other studies except for the dates of October 15, 1958 and December 31, 1954, is that correct? A. That is correct.

Presiding Examiner: Mr. Everett, does that complete your cross-examination of this witness?

Mr. Everett: May I have just a moment more, Mr. Examiner, to check my notes?

Presiding Examiner: We will take the afternoon recess at this time.

(At this point, 3:10 o'clock p.m., a recess was taken until 3:20 p.m.)

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Presiding Examiner: Have you any further questions, Mr. Everett? Mr. Everett: Yes, sir, we do.

By Mr. Everett:

Q. Mr. Sample, did you make any studies with respect to the 66 KV system between Highgrove and Colton, or with respect to the 33 KV system between Highgrove and Riverside? A. No, I did not.

Mr. Everett: Mr. Examiner, at this time the Staff wishes to offer in evidence Item M.

Presiding Examiner: I hear no objection. Item M will be admitted.

Mr. Goldberg: Mr. Examiner, am I correct there has been no ruling yet or an offer with respect to items by reference that were marked yesterday?

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Presiding Examiner: As far as my notes show, I, J, K and L have not yet been offered.

Mr. Goldberg: That is what I thought.

(The document referred to as Item M by reference, was received in evidence.)

Mr. Everett: Mr. Examiner, the Staff wishes to offer in evidence items by reference I, J, K and L.

Mr. Bury: I would like to be heard on that, Your Honor.

At the time those items were identified, and Dr. Sorensen was questioned with respect to them, he indicated that he had

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not seen that material before and was not familiar with the manner in which it was prepared. I would hope that we might, with the indulgence of the Examiner, be able to develop through Mr. Sample just what is contained in those exhibits. And I believe that that testimony would show that it is entirely incompetent for the purpose for which it was offered by staff, and after hearing that testimony that it would not be received. I would only ask at this time that you reserve ruling and permit us an opportunity to present that evidence.

Presiding Examiner: I will reserve ruling on Items I, J, K and L at the request of counsel for Edison.

Does that conclude your examination of this witness?

Mr. Everett: Yes, sir, it does.

Presiding Examiner: Mr. Goldberg?

Cross-Examination

By Mr. Goldberg:

Q. Mr. Sample, it has been established on the record that with respect to Sheet 5 of Exhibit No. 11, where you studied the hour of 6 p.m., for July 9, 1955, that you could have met the standard of the highest value Davis to Parker in 1955 by using another hour of that same day,

9 p.m., I believe, is that right? A. That is what he informed me.

Q. Did you put that hour of 9 p.m., on the board? A. No, I did not.

Q. Did you prepare the study that appears on Sheet 5 of

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Exhibit 7 at the very same time that you studied and prepared the hours reflected on the other sheets of Exhibit 11? A. No, I did not.

Q. This study shown in Sheet 5, was it prepared at a later time than the study shown on the other sheets of Exhibit No. 11? A. No, it was the second study, the second one that was studied.

Q. I am not sure I understand the answer. A. In time sequence of when each individual study was put on the board, and it takes days of preparation to put one study on the board, it was the second study that was put on the board.

Q. Let me be sure that I understand. You have seven studies in Exhibit No. 11. A. Yes.

Q. Are you saying that of the seven studies in Exhibit No. 11, Sheet No. 5 was the second? A. In the time that it was put on the board as a study, it was the second one.

Q. That was put on the board? A. Yes.

Q. Which one was put on the board first, of the seven shown?

Or perhaps this might be desirable. Let's do it this way.

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State for the record the date and hours studied, all studies you made on the board, in connection with this case, whether or not presented in Exhibit No. 11, in the sequence in which they were put on the board. A. That

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will take me some time to work this out. Do you want me to take the time now?

Q. You say some time? A. Five to 10 minutes.

Mr. Goldberg: Is there anybody else in the room that could be working it out while we go ahead?

The Witness: I am not sure that they are acquainted with my studies.

Mr. Goldberg: I see.

Presiding Examiner: Is it relevant, Mr. Goldberg? What difference does it make if he made one of them before the other one or not?

Mr. Goldberg: It may have some significance, Mr. Examiner. It is a fact that I am interested in establishing. Let's pass it for the moment.

By Mr. Goldberg:

Q. Did you yourself put each of the studies on the board? A. Do you mean did I do it without any assistance? No.

Q. Did you prepare those charts that are part of Exhibit 11 yourself, or were they prepared by someone else? A. They were prepared under my supervision.

[illegible]

Q. I see. I notice that on each of the sheets with the exception of Sheet 3, I see, "Readings given x HW." Now, is there any reason why that phrase was omitted from Sheet 3? A. No no reason why it is omitted. It should have been in there. Does it appear "Readings given is understood" on the second and third from the bottom?

Mr. Goldberg: No, no note.

The Witness: Are you on Sheet 3?

By Mr. Goldberg:

Q. I thought I was. Sheet 3 of 3. Does the same [illegible]

Presiding Examiner: Not on mine.

Mr. Goldberg: It isn't on yours, either.

The Witness: It looks like what happened is that in the printing of this sheet, in order to have enough copies, the original has been changed to multiple-two times on the bottom of the exhibit sheet that I have. I would like to have corrected on any of the Exhibit 11, Sheet 5 of 7, under—in the legend where it says, "Date, July 2, 1956, 6 p.m." a statement reading "Readings given in MW", and underneath that "Edison System—1956 suggested".

By Mr. Goldberg:

Q. That last legend that you just read, "Edison System, 1956 MW", did appear on mine, but it appeared there another

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legend which was entitled "Portion of Edison MW Usage System." A. It appears there are the only changes that have been made between these two sheets.

Q. I am Glencoe, too, on the same A. What was Joe on to mine.

A. All right. You notified that mistake by letter or wrote to staff or by letter and then Sunday by letter what Joe's to Parker? A. Yes.

Q. Now, what significance was to attach to your writing of the number, change to Joe's to Parker's by your test? A. I'm not showing the same thing and not one hour. I had no weight here and you to criticize, in my mind, I have had possible error in accounting of Edison to be done by proper time.

Q. Does the answer mean that in one or other has been a mis-statement between by proceedings of the [illegible] Company's Engineer and the other Joe's to Parker? A. No one answer will have a proper

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Parker to MWD, and, for that reason, that was why we chose these times. We only had a limited amount of time to prepare these.

Q. But that isn't my question. May I have it read to you, please?

(The question, as recorded, was read by the reporter.)

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The Witness: I don't know.

By Mr. Goldberg:

Q. Well, the fact is, is it not, that it doesn't necessarily follow that because the value Davis to Parker is the highest in the year, that the value at Highgrove of out of state energy also is higher than it would be, for example, when the values Davis to Parker are lowest? A. I don't know that that is the condition.

Q. Well, let's look at your study and see if we can tie it down.

If we look at Sheet 5, which is "Highest Value Davis to Parker" in 1955, you have five megawatts at Highgrove, right? A. Yes.

Q. Now, if we look at Sheet 2, of your Exhibit 11, which is the lowest value Davis to Parker, we have a substantially higher value at Highgrove, 40, is that right? A. That is right.

Q. So that there is no necessary relationship between the out of state energy at Highgrove and the value Davis to Parker, isn't that so? A. Apparently not for all energy.

Q. Can you tell us whether there is any equipment at the pumping loads which are reflected in your sheets in Exhibit 11, that has a special affinity for Davis generated

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power so that these pumping loads can pick out of the flow only Davis energy? A. No.

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Q. And you are not to be understood as having testified that the pumping loads out of the flows passing by these points select only Davis energy? A. No—only that the demands are sufficient to take care of any energy that has come from them.

Q. And you have not undertaken to say whether the demands are taken care of by Hoover generated energy and/or Davis generated energy? A. No, I have not.

Q. The record shows that you undertook your assignment in this case with respect to the calculator board about the first of November, and that it took several weeks to accumulate the data, and that you completed your studies bear the end of November, 1959, 10 days before the date you testified, I believe was the exact testimony.

Now, then, from whom did you receive your assignment? A. Directly—I have an immediate superior, Mr. Ashley.

Q. And was it Mr. Ashley who gave you your assignment? A. There were others in the room when I was told to go ahead on a board study, but as to which one said, "You do this" I don't remember.

Q. I see. In other words, this was the outgrowth of a

conference. A. More or less, yes.

Q. And were you instructed that you were not to deal with the portion of the system between Highgrove and Colton? A. No.

Q. Was it your decision not to deal with the system between Highgrove and Colton in setting up your board studies? A. I was instructed to prepare a study on the 220 KV.

Q. And you construed that as meaning that you were to not concern yourself with the facilities between the

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220 KV at Highgrove, and the City of Colton? A. No. There is time involved in preparing these studies, and when we come to the position of my turning in these values, there is no more time left for these studies. Whether they made the decision they would not want any additional studies, that I don't know.

Q. But when you undertook the studies, what were your instructions? A. To prepare studies on the 220 KV system for those portions of Edison system, MWD and USBR involved in the delivery of energy to Highgrove substation.

Q. Now, for what purpose? Were you advised as to the purpose of the study? A. To see what the board would show.

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Q. Show with regard to what? A. Megawatts.

Q. Well, with respect to the issue in this case, as to whether interstate power reaches the City of Colton? A. I was aware, from the time that the FPC staff was out there, that this was an issue. That did not necessarily say that this is to prove one way or another.

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Q. What I am really trying to ascertain—and I am not sure I have yet—is what was the objective of your assignment. A. To see if the board would show us the megawatt flows. We had never prepared a load flow of this nature on the board.

Q. Did you discuss at that time how the results were to be used? A. I do not think so.

Q. At the time of this discussion, out of which your assignment came, had you had access to the staff engineering report, which is referred to in the Commission's order initiating this case? A. Yes, I had.

Q. Had you read it? A. Yes, I had.

Q. Including the text? A. Including the text.

Q. And having read it, including the text, you were aware at that time about the entitlement of MWD, were you not? A. The entitlement of MWD?

Q. Yes. A. I do not remember it as such.

Q. May I refresh your recollection? A. Certainly.

Q. May I show you a copy of that report, and direct

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your attention to page 3 and to the section which is headed "Metropolitan Water District," and give you an opportunity to just look at that.

Mr. Bury: Are you asking the witness to assume that all of the statements contained in that paragraph are correct?

Mr. Goldberg: I am not asking him to make any such assumption, yet.

The Witness: I had made a cursory examination of that before, but I do not remember the values in it.

By Mr. Goldberg:

Q. Well, it does state, does it not, that under contracts for the Department of the Interior, MWD had been allotted three generators at Hoover Dam Power Plant, plus firm energy associated therewith, and half the power and energy available at Parker Dam? A. That is how it reads.

Q. Yes. And at the time you were making your studies, and today, you had completely forgotten that? A. Yes.

Q. Now, I think you have said that this calculator board does not help you to identify source of energy on the type of system that you have. Is that a fair summary if not your exact words? A. In the system that we have shown here.

Q. Yes. A. The board will not allow us to identify at loads—from

(620)

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what generator the electricity came from.

Q. May we look at Sheet 5 of Exhibit 11. You notice 72 megawatts at Iron Mountain. A. Yes.

Q. Can you identify the source of that 72 megawatts? A. No, I cannot.

Q. Well, maybe I can help you. How much is coming into Camino? A. To Camino from——

Q. Yes. A. The board showed there was 60 megawatts coming from MWD Hoover, and 12.5 megawatts coming from the 220 kv switch rack at Gene and Intake.

Q. And I take it you would say that the sources of the 12.5 megawatts shown coming from Gene and Intake would be generation at States Hoover and/or Davis. A. Yes.

Q. Now, if we add—and the generation, certainly 60 megawatts, shown coming from MWD Hoover, you would agree is identifiable as MWD Hoover generation. A. Mathematically it is the sum of those two values.

Q. Well, isn't it the source, based upon the Sheet 5 that I am looking at—isn't the source of the 60 megawatts MWD Hoover based upon Sheet 5? A. Not the load. The source of the 60 which is read on

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the one line is based on two generators from MWD Hoover. But I would not know which generator.

Q. But they are both at MWD Hoover. A. In this case both of them are at MWD Hoover.

Q. So in this case we have no trouble identifying the source of the 60 megawatts, right? A. From one of the two generators, or a combination of some of the values for the two generators at MWD Hoover.

Q. Yes. All right. Now, would you say that the 72 megawatts shown at Iron Mountain on Sheet 5 is the sum

of the 12.5 and 60 shown flowing into Camino? A. Mathematically the sum, yes.

Q. And would you still say, Mr. Sample, that under the circumstances shown on Sheet 5, that the calculator board has not enabled you to identify the source of the 72 megawatts? A. No, because I do not know which generator at States Hoover or at Davis is supplying the energy that comes through Gene and Intake at 12.5 megawatts.

Q. First, you do know that all of that 72 is out of state, right? A. At this instant it is all out of state.

Q. Yes. And you do know that 60 megawatts of that 72 was generated at MWD Hoover? A. That is right.

Q. So despite multiple loads and multiple sources, the

calculator board in these circumstances has enabled you to identify generation. A. Not all generation.

Q. I did not say all generation—some generation. A. Some generation—because it is one bank and one line.

Q. All right. But despite the fact that the issue in this case is whether out of state energy is used in providing the requirements of Colton, you did not run any studies that took into account all of the part of the system involved in serving Colton, right? A. No, I did not.

Q. Now, let us look at Sheet 7 of Exhibit 11. Now, under the circumstances present there, despite multiple sources and multiple loads and the type of network you have, the calculator board enables you to identify the 152 megawatts shown at Iron Mountain as having come from generation at MWD Hoover, isn't that so? A. That is true.

Mr. Goldberg: Those are all the questions we have, Mr. Sample.

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Presiding Examiner: Does the California Commission have any questions?

Mrs. Pajalich: Yes, sir.

By Mrs. Pajalich:

Q. Mr. Sample, yesterday morning Mr. Everett brought up

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the subject of kilowatt hours, kilowatt hour readings. Can you tell us whether the net kilowatt hour flow for 1958 is from MWD into Edison or from Edison into MWD through the Hayfield connection.

Mr. Goldberg: May I have that question again.

(The question, as recorded, was read by the reporter.)

Mr. Goldberg: This is the net kilowatt hours.

Mrs. Pajalich: Yes.

The Witness: I don't know for sure. Either Mr. Montgomery or Mr. Ashley would have those figures.

By Mrs. Pajalich:

Q. Now, referring to the transcript, page 532—do you have a copy of it? Particularly down at line 21. In answer to a question posed to you by Mr. Everett, on line 18, "Well, in determining the out of state power reaching Highgrove Substation, why would it be necessary to designate these sources here—MWD Hoover, States Hoover."

You answered, "You could say the megawatt reading at Highgrove, if there were no megawatts being delivered from Parker into this 220 kv system—you could say that the megawatt reading at Highgrove was out of state energy."

Now, Mr. Sample, on your board study aren't there megawatt readings from another source of supply, namely, Etiwanda? A. Yes. In this instance, I was referring to the Hayfield-Highgrove line.

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Q. In reply to a question posed to you by Mr. Everett, you stated that it was possible that there might be six or so more megawatts being delivered to the Hayfield connection than shown in your Exhibit 11. There could also be six or more less could there not? A. Yes, due to the time sequence in reading.

Q. Now, Mr. Goldberg asked you if the pump at Iron Mountain or Eagle Mountain had any special affinity for Davis energy, all the pump loads. Does the City of Colton have any special affinity for interstate energy?

Mr. Goldberg: I object to that, because this witness has admitted he has made absolutely no studies that involve the system between Highgrove and Colton that are necessary to answer that question.

Mr. Everett: The Staff would have to object to that question, Mr. Examiner.

Mrs. Pajalich: Mr. Examiner, I think a child could answer that question. Even I could answer that question.

Mr. Goldberg: Well, you cannot take that witness stand.

Mr. Everett: Are you testifying?

Presiding Examiner: Well, he said he made no study of the movement of current, as I understood, from Highgrove to the City of Colton. The objection is sustained.

By Mrs. Pajalich:

Q. As an engineer, Mr. Sample, would you need to make a

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study to answer that question? A. No.

Q. Could you answer it, then? Does the City of Colton have any special affinity for energy generated outside of the State of California?

Mr. Goldberg: Mr. Examiner, I would assume that what this question proposes to take this witness into is the subject of the physics of electric energy flows. We have had no testimony that this witness is qualified in that respect. The only witness who has been produced here from the viewpoint of the physics of electric energy has been Dr. Sorensen. I therefore object. And I submit that the issue in this case cannot be answered by a child.

Mrs. Pajalich: That is not directed to the issue in this case. It is directed merely to some particular affinity of a city for a particular type of energy.

Presiding Examiner: The objection is well taken.

By Mrs. Pajalich:

Q. Going back to some of the questions asked by Mr. Everett, relative to your Exhibit 11, according to my recollection Mr. Everett asked substantially this. If the sum of energy moving from Gene and MWD Hoover gets to Highgrove through Hayfield—and your answer was yes. But would that not be true only in those instances where the energy was not flowing from Highgrove to Hayfield?

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A. Would you read that question again, please.

(The question, as recorded, was read by the reporter.)

The Witness: Yes.

Mrs. Pajalich: I have nothing further, Mr. Examiner.

Presiding Examiner: Mr. Bury, have you any redirect?

Mr. Bury: Yes, a little, Mr. Examiner.

Redirect Examination

By Mr. Bury:

Q. Mr. Sample——

Mr. Goldberg: Mr. Bury, you are not planning, are you, at this time to get into this question of the merits of the data in the Form 12—are you?

Mr. Bury: No. I thought it would be best to follow right away with the topic we have been discussing.

Mr. Goldberg: Because I was going to make a point that that seems to me rebuttal.

Mr. Bury: Well, perhaps it is. We will meet that a little later, I think.

By Mr. Bury:

Q. Mr. Sample, Mr. Everett asked you a number of questions in which he made reference to the entitlement of the Metropolitan Water District to energy from Parker Dam. In preparing Exhibit 11, is it true that you considered only the power flow conditions as they could be determined from metering and other sources of information you disclosed, and

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did not rely in any respect upon any interpretation of contracts for energy between the parties concerned? A. Yes.

Q. There was a further series of questions dealing with the accuracy of meters, and some reference to a variation of six or seven megawatts as not being unusual in the results of studies reflected by Sheets 3 and 4 of Exhibit 11.

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Would you explain more specifically the reasons for the variations in values between Sheets 3 and 4, and the relationship of that variation in those values from the accuracy of the meters from which data are taken? A. The reasons, as indicated in the direct, were that the data reported, from which we took these values to put on the board, are generally records of reading the indicating watt meters, and the number of recorded values that are being used. There are inherent errors in meters and in their readings. And of course all meters (sic) readings were not taken simultaneously. It is expected that there will be a time lag of at least three or four minutes between the time the first and last of the meters at these various——

Q. Well, Mr. Sample, was it the import of that that these variations of seven or eight megawatts, which you referred to, are the cumulative effect of all of those factors, and not just the effect of the accuracy or inaccuracy of a given meter?

Mr. Goldberg: Mr. Examiner, it is too late, of course, to

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make this objection now. But I wish counsel would not lead the witness. I think his question more properly should have been what is the import of it, and let the witness tell us.

An objection that it is leading comes too late under those circumstances.

Mr. Bury: Is there an objection to the question?

Presiding Examiner: He said his objection was too late now. He wants to show it on the record. But he says it is too late.

Mr. Goldberg: I hope it will not continue.

The Witness: Well, the thing that causes the greatest error in reading of these, or in taking these values is that the readings are not taken simultaneously.

Presiding Examiner: He has said that time and time again, Mr. Bury, without you prompting him.

Mr. Goldberg: That is true.

Mr. Bury: This is preliminary to another question.

By Mr. Bury:

Q. Mr. Sample, there has been testimony as to the primary purpose for which the Edison Company uses this AC network analyzer, with respect to system design and so on. I wanted to know whether or not this fact of lack of coincidence between values to be used in the study occurs in the type of studies which you described as usually being performed on this board. A. No, because all of the values are estimates of future loading, and our regular use of the board, where we will project

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a loading of different substations to anticipate whether new lines will have to be installed, because of overloading, or whether our voltage gradient will be too low, with a one line out condition—that is the general use of the board.

Q. During the course of your cross-examination you were shown a copy of a document since identified as Item M, and you were asked to identify certain figures thereon which appear to be records of the U. S. Bureau of Reclamation. Did you obtain that same information directly from the U. S. Bureau of Reclamation in the preparation of your studies, as well as from Exhibit 3? A. No, I did not.

Q. You relied on Exhibit 3 alone for that value? A. That is correct.

Q. Did you receive other values, or information, concerning other values from the Bureau of Reclamation which you used in your study. A. Yes, I did.

(629)

Q. Did not you run into circumstances when—excuse me, perhaps I am leading. I had better back off.

Were you also able to reconcile the values furnished to you by the Bureau of Reclamation? A. No, I have already stated one instance of where the value for one end of the line, coming from Davis to Parker, was recorded on this sheet as 16 megawatts, and for that time

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on the sheet that was given to me from the USBR for Davis readings, it was 34 megawatts.

Q. That example may not be representative. Were there a number of others of smaller magnitude? A. Yes, there were.

Q. Did you find the same condition with information which you received within the Edison Company? A. Yes, I did.

Q. Turning to Exhibit 11, Sheet 6, and particularly to the figure just immediately to the left of the circle entitled "Camino," for the date of April 30, 1956, 8 p.m., I believe Mr. Everett asked you concerning the value of 8.4 which appears immediately to the left of the circle entitled "Camino." And he compared that figure with the figure which appears in the last column of one of the pages of Exhibit 3. I wanted to ask you this, with respect to those two figures.

The figure appearing on page 6 purports to indicate the power flow at what precise point on the 220 system depicted here? A. Read at the Camino intersection of the line from MWD Hoover, the line from Gene and Intake, and the line from Iron Mountain.

Q. Do you know whether or not the value which appears in the last column of Exhibit 3 is or is not a measurement of a power flow at any particular point on the system depicted here?

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A. I do not know that it is a measurement. It is a subtraction.

Q. A subtraction of what from what? A. A subtraction of the Parker to MWD delivery of 62 megawatts, and a subtraction of the Gene requirements of 53.6 megawatts.

Q. And the 62 megawatt figure represents a measurement at what point on that system? It is immediately to the right of the Parker 220 kv switch rack. A. I have assumed it is a measurement of the 220 kv rack, at Parker.

Q. There was some discussion upon the selection of the time which the study reflected on Sheet 6 of 7 of Exhibit 11. A. Which sheet?

Q. Sheet 6, the same one we have been discussing. Is that the last sheet, or the study latest in time, or a study representing a period latest in time made by you which depicts any flows westward from Gene towards Camino? A. That is the last day that the Exhibit 3 shows any values in the Davis to Parker column or Parker to MWD column, or the Davis-Parker-Camino column in Exhibit 3.

Q. And Sheet 7 does not reflect a westward flow. A. It does not.

Mr. Bury: Mr. Examiner, those are all the questions I have on I think what we properly call redirect of this witness.

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I would like to request the opportunity to elicit from this witness testimony concerning the preparation of Schedule 18 of Form 12, two of which were marked by reference in this record.

Presiding Examiner: Those are the documents filed by Edison with this Commission regularly, are they not?

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Mr. Bury: That is right. I believe that it is our position that those figures were used improperly by staff counsel in trying to put certain hypotheses to Dr. Sorensen for analysis. And I think that unless we explain the true nature of those figures—and when we do, we will see that the hypotheses were improper—trying to compare apples and oranges.

Presiding Examiner: Do you have some other rebuttal?

Mr. Bury: No. As far as I know, this would be the only thing which might be considered rebuttal which we would have.

Presiding Examiner: Mr. Goldberg, will you have any rebuttal?

Mr. Goldberg: We may have one matter, but it would be very short.

Presiding Examiner: Before we get to that, we will get through with the cross-examination of the other two witnesses, and then we will get to the rebuttal question.

The court will be in recess until ten o'clock tomorrow morning.

(Whereupon, at 4:25 o'clock p.m. the hearing was recessed until 10:00 o'clock a.m., Friday, May 6, 1960.)